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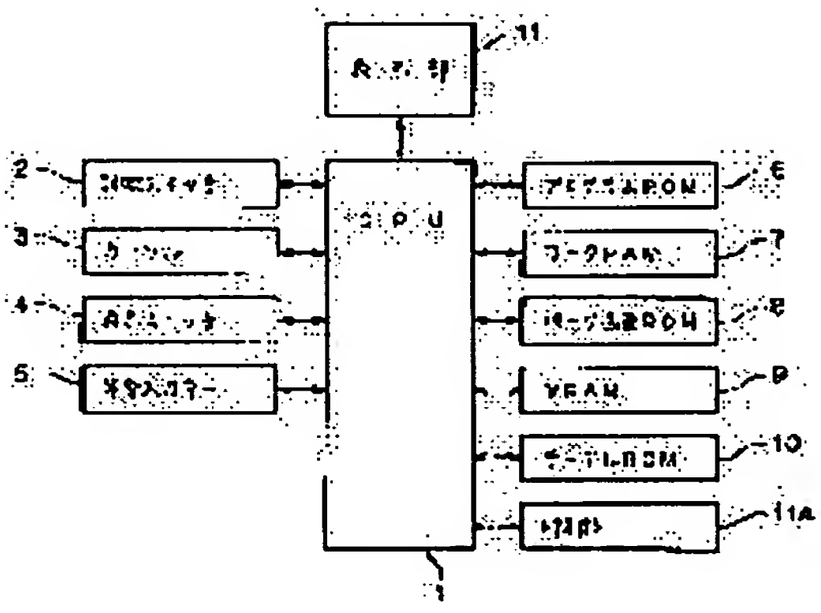
(71)Applicant : CASIO COMPUT CO LTD
(72)Inventor : MURATA YOSHIYUKI
YAMAGUCHI YOSHITO

(54) FACE IMAGE PRODUCING DEVICE

(57)Abstract:
PURPOSE: To quickly and easily produce a face image in accordance with each age and also to objectively evaluate the difference between both ages which are decided subjectively and objectively from the face image.
CONSTITUTION: When the data on ages are designated by an age input key 5, a CPU 1 reads the face feature data accordant with the designated age data out of a parts screen ROM 8 based on the program stored in a program ROM 6. Then the CPU 1 reads the parts patterns of each corresponding parts out of the ROM 8 based on the face feature data and combines these parts patterns with each other. Thus an image of one's own face or another person's face, for example, is produced and displayed at a display part 11. In such a way, a face image accordant with each age can be quickly and easily obtained.



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CLAIMS

[Claim(s)]
[Claim 1] A parts pattern storage means to memorize the parts pattern showing a face image for every parts, A face description data storage means to memorize the face description data according to age, and an assignment means to specify the data about age, If the data about age are specified by this assignment means, the face description data according to the data concerned will be read from said face description data storage means. The face image listing device characterized by having a face image creation means to read and combine the parts pattern for every parts which corresponds from said parts pattern storage means according to the face description data, and to create a face image.
[Claim 2] Said face description data storage means is a face image listing device according to claim 1 characterized by having memorized whenever [aspect ratio / of a face /, height / of an eye /, magnitude / of an eye /, number / of a wrinkling /, and retreat / in the hair case] as face description data according to age.
[Claim 3] Said assignment means is age actual as data about age, and a graphic display according to claim 1 characterized by specifying at least one of birth dates.
[Claim 4] The face image listing device according to claim 1 characterized by having further a means to display or print the face image created by said face image creation means.
[Claim 5] A face image data storage means to memorize the face image data constituted combining the parts pattern for every parts, An age data storage means to memorize the data about the age corresponding to the face image data memorized by this face image data storage means, A face description data storage means to memorize the face description data according to age, and an assignment means to specify the data about age, When the data about age are specified by this assignment means, those tbe data, An age difference output means to output age difference data based on the data about the age memorized by said age data storage means, if face image data is read from said face image data storage means and a basic face image is created -- being also alike -- with the age difference data outputted from said age difference output means It is based on the face description data memorized by said face description data storage means. The face image listing device characterized by having a face description data origination means to change the face description data memorized by said face description data storage means, to correct the face image which is to said base based on this changed face description data, and to create a new face image.
[Claim 6] Said face image data storage means is a face image listing device according to claim 5 characterized by memorizing the face image data about one's face or others' face.
[Claim 7] Said age data storage means is age actual as data about age, a birth date, what year future, and a face image listing device according to claim 5 characterized by memorizing at least one of of what year after.
[Claim 8] Said face description data storage means is a face image listing device according to claim 5 characterized by having memorized whenever [aspect ratio / of a face /, height / of an eye /, magnitude / of an eye /, number / of a wrinkling /, and retreat / in the hair case] as face description data according to age.
[Claim 9] Said assignment means is age actual as data about age, a birth date, what year future, and a face image listing device according to claim 5 characterized by specifying at least one of of what year after.
[Claim 10] Said face description data-origination means is the face image listing device according to claim 5 characterized by to perform modification of the parts of a profile according to the aspect ratio of a face, modification of the location of an eye, modification of a hairstyle, and the addition of a wrinkling as modification processing of the face description data memorized by said face description data-storage means, and to create the past face or the anticipation face of the future based on this changed face description data.
[Claim 11] The face image listing device according to claim 5 characterized by having further a means to display or print the new face image created by said face description data origination means.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] When this invention specifies age in detail with respect to a face image listing device, it relates to the face image listing device by which a face image suitable of the age is created automatically.
[0002]
[Description of the Prior Art] In order to create a face image conventionally, the graphic display using a microcomputer is used and the face image is created with this equipment by combining a parts pattern with each parts (for example, an eye, eyebrows, opening, etc.) of every [which constitutes a face].
[0003]
[Problem(s) to be Solved by the Invention] However, when creating a face image by the conventional graphic display, and its face was created in the combination of the parts pattern for every parts, it was very difficult to create a face suitable for others' age with the combination of the parts pattern for every parts suddenly at any rate, and it had required the long time for creation. Moreover, special skill was needed in order to have created the face suitable for others' age. Furthermore, there was a trouble that there were many big differences, by the age grasped as the age subjectively grasped from the face image after creating objective.
[0004] Then, this invention can create a suitable face image quickly and easily of age, and aims at offering the face image listing device which can be evaluated objective for the inconsistency of the age moreover subjectively grasped from a face image, and the age grasped objective.
[0005]
[Means for Solving the Problem] The face image listing device by invention according to claim 1 for the above-mentioned purpose achievement A parts pattern storage means to memorize the parts pattern showing a face image for every parts, A face description data storage means to memorize the face description data according to age, and an assignment means to specify the data about age, If the data about age are specified by this assignment means, the face description data according to the data concerned will be read from said face description data storage means. It is characterized by having a face image creation means to read and combine the parts pattern for every parts which corresponds from said parts pattern storage means according to the face description data, and to create a face image.
[0006] Moreover, you may make it said face description data storage means memorize whenever [aspect ratio / of a face /, height / of an eye /, magnitude / of an eye /, number / of a wrinkling /, and retreat / in the hair case] as face description data according to age as a desirable mode. You may make it said assignment means specify at least one of age actual as data about age, and birth dates. You may make it have further a means to display or print the face image created by said said face image creation means.
[0007] The face image listing device by invention according to claim 5 A face image data storage means to memorize the face image data constituted combining the parts pattern for every parts, An age data storage means to memorize the data about the age corresponding to the face image data memorized by this face image data storage means, A face description data storage means to memorize the face description data according to age, and an assignment means to specify the data about age, When the data about age are specified by this assignment means, those tbe data, An age difference output means to output age difference data based on the data about the age memorized by said age data storage means, if face image data is read from said face image data storage means and a basic face image is created -- being also alike -- with the age difference data outputted from said age difference output means It is based on the face description data memorized by said face description data storage means. It is characterized by having a face description data origination means to change the face description data memorized by said face description data storage means, to correct the face image which is to said base based on this changed face description data, and to create a new face image.
[0008] Moreover, you may make it said face image data storage means memorize the face image data about its face or others' face as a desirable mode. You may make it said age data storage means memorize at least one of of age actual as data about age, a birth date, what year future, and what year after. You may make it said face description data storage means memorize whenever [aspect ratio / of a face /, height / of an eye /, magnitude / of an eye /, number / of a wrinkling /, and retreat / in the hair case] as face description data according to age. You may make it said assignment means specify at least one of of age actual as data about age, a birth date, what year future, and what year after. Said face description data origination means performs modification of the parts of a profile according to the aspect ratio of a face, modification of the location of an eye, modification of a hairstyle, and the

addition of a wrinkling as modification processing of the face description data memorized by said face description data storage means, and you may make it create the past face or the anticipation face of the future based on this changed face description data. You may make it have further a means to display or print the new face image created by said face description data origination means.

[0009]

[Function] In invention according to claim 1, if the data about age are specified with an assignment means, a face image (for example, its face or others' face) will be automatically created by reading the face description data according to the data concerned from the face description data storage means, reading the parts pattern for every parts which corresponds from a parts pattern storage means according to the face description data, and combining. Therefore, a suitable face image can be created quickly and easily of age, without needing special skill. Moreover, it becomes possible to evaluate an inconsistency with the age grasped as the age subjectively grasped from the created face image objective objective.

[0010] In invention according to claim 5, beforehand A face image (for example, one's face or others' face), If the age at that time is registered and other different age from the age is specified Age difference data are outputted from the data about the age memorized by the age data storage means. This age difference data, It is based on the face description data memorized by the face description data storage means. The face description data memorized by the face description data storage means are changed, a basic face image is corrected based on this changed face description data, and a suitable new face image (for example, the past face or the anticipation face of the future) is automatically created by that age. Therefore, the face of the past when precision is high, or the anticipation face of the future can be created simply and quickly, without needing special skill.

[0011]

[Example] Hereafter, the example of this invention is explained with reference to a drawing. Drawing 1 is the block diagram showing one example of the face image listing device concerning this invention. In drawing 1 , a face image listing device is roughly divided and is constituted by CPU1, the description switch 2, the cursor switch 3, the display switch 4, the age input key 5, a program ROM 6, a work piece RAM 7, the parts screens ROM8 and VRAM9, a table ROM 10, and the display 11. If CPU1 controls the whole equipment and assignment actuation of the parts of a face, the description, etc. is performed by the description switch 2, the cursor switch 3, the display switch 4, and the age input key 5 The program stored in the program ROM 6 according to the actuation information is followed. By reading the face description data according to age data from a table ROM 10, and reading and combining the parts pattern for every parts which corresponds from the parts screen ROM 8 according to the face description data Processing which creates a face image (for example, its face or others' face) is performed. CPU1 has a function as a face image creation means.

[0012] The description switch 2 specifies in order each parts (for example, a hairstyle, the profile of a face, eyebrows, an eye, a nose, opening, etc.) which are the switches which specify the description of a face and constitute a face. Six pieces are prepared as each parts which constitute a face from this example. About the face image displayed on the display 11, the cursor switch 3 chooses alternatively each parts (for example, hair, eyebrows, an eye, a nose, opening, etc.) which constitute a face. Specifically, parts are chosen by moving the cursor location on a screen (for example, expressed with a flashing condition). In addition, a mouse etc. may be used other than the cursor switch 3. Use of a mouse is the same about other switches.

[0013] The display switch 4 is operated, when display a face image on a display 11 and correcting it, or the created face image is in a desired condition and it sets as a completion screen. The age input key 5 inputs and specifies the data about age, and has age actual as data about age, and a birth date. A ten key is used so that the age input key 5 can input age or a birth date easily. The age input key 5 constitutes an assignment means to specify the data about age.

[0014] The program ROM 6 stores the control program of CPU1, and the contents are shown in each below-mentioned drawing. A work piece RAM 7 is used as a work area in the control which CPU1 performs. The parts screen ROM 8 has memorized the parts pattern showing a face image for every parts, and constitutes a parts pattern storage means. Here, an example of the parts pattern for every parts memorized on the parts screen ROM 8 is shown like drawing 2 . In drawing 2 , there are various kinds of things which constitute a face as a parts class (N) of face. In this case, as a parts class (N) of face, a hairstyle and (N) =2 are prepared for the profile of a face and two or more sorts of (N) =3 are prepared for (N) =1 for an eye and (N) =4 to call it a supercilium. In addition, a thing called a nose and opening is prepared not only for the example which showed the parts class (N) to drawing 2 but for others. Moreover, other parts classes (N) may be prepared.

[0015] if a parts pattern is the deformation mode (it has the description according to age especially) of each parts, and it is the example of drawing 2 , for example, its attention is paid to the hairstyle of the male of (N) =1 on the other hand -- as parts pattern NO. of this hairstyle -- [01], [02], and [03] ..... as -- corresponding to various kinds of types, two or more sorts of things are prepared beforehand, and are memorized on the parts screen ROM 8. It is arranged so that age may go up, as parts pattern NO. becomes large. Similarly, each parts pattern is beforehand prepared also about the profile of a face, the eye, and the supercilium. Moreover, about each parts pattern, there is a thing as the variation beforehand prepared further, and memorized, for example, shown in drawing 3 as a variation of the profile pattern of parts pattern NO. [03]. In drawing 3 , there are 16 kinds of each profile patterns from [A-11] to [A-44], and these have various kinds of variations according to the actual condition that the profile of various faces exists.

[0016] When VRAM9 creates a face image, the creation image is memorized per 1 screen, and semiconductor

memory is used as VRAM9, for example. A table ROM 10 memorizes the face description data according to age, and constitutes the face description data storage means. As face description data according to age, there is whenever [aspect ratio / of a face /, height / of an eye /, magnitude / of an eye /, number / of a wrinkling / and retreat / in the hair case] etc. When the face description data memorized by the table ROM 10 are explained concretely, there is a thing as shown, for example in drawing 4 . ...., such as a wrinkling of an outer canthus, a wrinkling of a frame, and a wrinkling of a cheek, has been arranged as parts which express the description of a face with drawing 4 to an axis of ordinate, 5 years old of age were divided into the axis of abscissa one by one from each 30 years old, and the description to 100 years old is arranged. And when its attention is paid to the wrinkling of an outer canthus, for example, there is no wrinkling of an outer canthus at the age of 30, but the description (in this case, wrinkling of an outer canthus) of a face according to age is beforehand memorized so that the wrinkling of an outer canthus may increase, as age goes up. In addition, not only an example as shown in drawing 4 but other examples are sufficient as the description of a face according to age.

[0017] A display (display means) 11 is in the middle of creation, displays the face image when choosing each parts, or displays the completed face image, displaying the image by which creation processing is carried out, and delivering and receiving data between VRAMs9 by CPU1. The display 11 has TV display 7 in order to display an image. In addition, the part which displays an image does not have not only a TV display but the monitoring device of dedication or CRT, and may display an image with liquid crystal, such as LCD. Or what is used also [applications / other] may be used.

[0018] Next, an operation is explained. Drawing 5 is a flow chart which shows the main program of face image creation processing. A start of this program performs initial setting at step S10 first. In initial setting, clearance of various registers and work pieces RAM7 and VRAM9, initialization of a subroutine, reset of a flag, etc. are performed. Subsequently, a pointer M1 is cleared to [0] at step S12. A pointer M1 is used as an object for the assignment when inputting information, such as the description of a face, and age, and the value is stored in the register with which it corresponds in CPU1.

[0019] Subsequently, the contents of VRAM9 are displayed on a display 11 at step S14. Thereby, it is for example, in the middle of creation, and the face image and the completed face image when choosing each parts are displayed on a display 11. And henceforth, it stands by to this step S14, and required processing is performed based on the interruput signal from each switch at this time. That is, all processings when choosing each parts etc. are performed by the interruption routine shown below.

[0020] Drawing 6 is a flow chart which shows the description switch interruption routine. If the description switch 2 is operated, it will shift to this description switch interruption routine. If it shifts to this interruption routine, only [1] will increment a pointer M1 at step S20 first. Subsequently, it distinguishes whether a pointer M1 is equal to [9] at step S22. Here, since there are eight pieces as face description data showing the description of a face, a pointer M1 is compared with [9] for judging whether it was set to [9] which is a value exceeding eight pieces.

[0021] If a pointer M1 is not equal to [9], it progresses to step S26 and the contents of screen data are transmitted to VRAM9 by making the data of the address in a work piece RAM 7 (M1+OFFSET1) into a start address. For example, at the time of M1=1 (1+OFFSET1), the data of an address serve as a start address, and the contents of the screen data of a work piece RAM 7 are transmitted to VRAM9.

[0022] Here, as shown in a work piece RAM 7 at drawing 7 , various kinds of required data are mainly (OFFSET 5+2) temporarily stored in before an address from an address (OFFSET 1+1). For example, the data as which the area which makes an address (OFFSET 1+1) the address is specified by the pointer M= 1 and which become ADD1 are stored, and this data corresponds to the address for every parts memorized on the parts screen ROM 8. The data as which the area which makes an address (OFFSET 1+7) the address is specified by the pointer M= 7 and which become ADD7 are hereafter stored by similarly storing the data as which the area which makes an address (OFFSET 1+2) the address is specified by the pointer M= 2 and which become ADD2. Even the data which are finally specified by the pointer M= 8 at least and which become ADD8 are stored.

[0023] if other area of a work piece RAM 7 is explained -- an address (OFFSET 2+1) and an address (OFFSET 2+2) -- the data corresponding to a cursor location in .... are stored. (OFFSET 3+1) an address and an address (OFFSET 3+2) .... is y register and the data about age are stored. (OFFSET 4+1) an address and an address (OFFSET 4+2) -- the data with which .... expresses the description of a face are stored. Data concerning [the area which makes an address (OFFSET 4+1) the address] a hairstyle are stored, and, specifically, the sex parameter which distinguishes a male or a woman is stored in the most significant bit (part shown by a) of data. A sex parameter is 1 bitwise, expresses a male at the time of [1], and expresses a woman at the time of [0].

[0024] Moreover, among the area which makes an address (OFFSET 4+1) the address, the data about a hairstyle are stored in the bit field b by the side of a high order (high-order-bit group), and the description data according to age are stored in it about a hairstyle in the bit field c by the side of low order (lower bit group) among these area.

[0025] (OFFSET 4+2) Data concerning [the area which makes an address the address] the profile of a face are stored, and a sex parameter is stored in most significant bit [of data] a. (OFFSET 4+2) Among the area which makes an address the address, the data about the profile of a face are stored in the high-order-bit group b, and the description data according to age are stored in it about the profile of a face at the lower bit group c among these area. (OFFSET 4+3) Data concerning [the area which makes an address the address] an eye are stored, and a sex parameter is stored in most significant bit [of data] a. (OFFSET 4+3) Among the area which makes an address the address, the data about an eye are stored in the high-order-bit group b, and the description data according to age are stored in it about an eye at the lower bit group c among these area.

[0026] Hereafter, data (for example, a nose, opening, etc.) are stored in condition that data concerning [the area which makes an address (OFFSET 4+4) the address similarly] a supercilium are stored, one by one. In addition, according to age, the mode which three kinds, the hairstyle and profile which were mentioned above, and an eye, have a remarkable change, therefore changed as description data according to age according to age about these three kinds (a hairstyle, a profile, eye) is stored as description data among the description parts of a face. (OFFSET 5+1) an address and an address (OFFSET 5+2) -- the data with which .... expresses the wrinkling of a face are stored. The data which carry out Seki to the wrinkling of an outer canthus are stored in the area which specifically makes an address (OFFSET 5+1) the address, the data which carry out Seki to the wrinkling of a frame are stored in the area which makes an address (OFFSET 5+2) the address, and the data which carry out Seki to the wrinkling of a cheek are stored in the area which makes an address (OFFSET 5+3) the address.
[0027] Now, although the data of an address serve as a start address at the time of pointer M1=1 (1+OFFSET1) and the contents of the screen data of a work piece RAM 7 are transmitted to VRAM9 as mentioned above, for example At this time, the data of the address in a work piece RAM 7 (1+OFFSET1) are ADD1, and those contents are one of the screens for every parts memorized on the parts screen ROM 8 as shown in drawing 8 . In drawing 8 , the screen data corresponding to the address of ADD1 are a screen which chooses sex, therefore at the time of M1=1, a screen as shown in drawing 9 (a) corresponding to ADD1 appears, and the screen to which one of assignment of [01]:males or [02]:woman is urged appears.
[0028] Similarly, in drawing 8 , the screen data corresponding to the address of ADD2 are a screen which chooses a hairstyle, for example, the amount of hair is rich and divides 73, and the amount of [02] of hair is thin, and [01] is divided 73, and has become like ..... The screen to which selection of a hairstyle is urged as shown in drawing 9 (b) corresponding to this ADD2 and which carries out a screen appears. The screen data corresponding to the address of ADD3 are a screen which chooses the profile of a face, for example, have become like [01], [02], and ..... Although illustration is omitted corresponding to this ADD3, the screen to which selection of the profile of a face is urged and which carries out a screen appears. the screen where the screen data corresponding to the address of ADD4 choose an eye -- it is -- [01] -- an eye -- a round shape -- an eyelid with a fold and [02] -- an eye -- an egg shape and [03] -- an eye -- a fox -- an egg ..... as -- it has become. [for example,] The screen to which selection of the form of an eye is urged as shown in drawing 9 (c) corresponding to this ADD4 and which carries out a screen appears.
[0029] The screen data corresponding to the address of ADD5 are a screen which chooses a supercilium, for example, as for [01], a form becomes [a supercilium] for three months, and, as for [02], ****** has become [the supercilium] like a ** type and ..... The screen to which selection of the form of a supercilium is urged as shown in drawing 9 (d) corresponding to this ADD5 and which carries out a screen appears. The screen data corresponding to the address of ADD6 are a screen which chooses a nose, for example, have become like [01], [02], and ..... Although illustration is omitted corresponding to this ADD6, the screen to which selection of a nose is urged and which carries out a screen appears. The screen data corresponding to the address of ADD7 are a screen which chooses opening, for example, have become like [01], [02], and ..... Although illustration is omitted corresponding to this ADD7, the screen to which selection of opening is urged and which carries out a screen appears. Moreover, although the screen data corresponding to the address of ADD8 are a screen which demands the input of age and illustration is omitted corresponding to this ADD8, the screen to which the input of the age from the age input key 5 is urged and which carries out a screen appears.
[0030] A return will be carried out if it passes through processing of return and step S26 to explanation of drawing 6 again. And the same processing will be repeated if it becomes the following description switch interruption routine. If a pointer M1 is first incremented at step S20 and a pointer M1 becomes equal to [9] at step S22 at this time, it progresses to step S24, and a pointer M1 will be returned to [1] and it will progress to step S26 after that. Thus, if the pointer M1 is incremented [1] every whenever the description switch 2 is operated, and Pointer M becomes equal to [9], returning a pointer M1 to [1] again will be performed. Therefore, the contents of screen data are transmitted to VRAM9 by making the data of the address (M1+OFFSET1) of the work piece RAM 7 corresponding to pointer M1=1 into a start address, and whenever the description switch 2 is operated, [1] every increment of the pointer M1 is carried out, and henceforth, the contents of the screen data of an address (M1+OFFSET1) are transmitted to VRAM9, and are displayed on a display 11.
[0031] Whenever the description switch 2 is operated, the contents of every screen data change, as shown in drawing 9 . That is, if the description switch 2 is operated, it will shift to the description switch interruption routine, and the screen shown in drawing 9 will appear each time. The operator will choose the description of a face about sex, a hairstyle, an eye, a supercilium, ..., etc., looking at the screen shown in this drawing 9 .
[0032] Drawing 10 is a flow chart which shows an age switch interruption routine. If the age input key 5 is operated, it will shift to this age switch interruption routine. If it shifts to this interruption routine, the age data first inputted into y register by actuation of the age input key 5 at step S50 are stored. For example, if age is inputted as 30 years old, the age data [30] are stored in y register. Subsequently, the contents (namely, age data) of the y register are written in the address (OFFSET3) of a work piece RAM 7 at step S52. Subsequently, Pointer M is set to [1] at step S54. Since a hairstyle corresponds in a pointer M= 1 and a profile and M= 3 correspond like an eye and .... in M= 2, Pointer M is set to [1] at step S54 for choosing description data called a hairstyle as the beginning, and subsequently choosing the description data (for example, parts pattern) according to age as the condition of a profile one by one.
[0033] Subsequently, it progresses to step S56 and distinguishes whether Pointer M is the range of [1] - [3]. When

Pointer M is in the range of [1] - [3], it judges whether it is the routine which chooses a hairstyle, a profile, and the description data of an eye as description data of a face. Description data called these hairstyles, a profile, and an eye are because the need of making it changing corresponding to age is large. When it is the routine which it is in the range of [1] - [3] at the time M of YES, i.e., a pointer, at step S56, and chooses a hairstyle, a profile, and which description data of an eye, it progresses to step S58 and the contents of the y register are changed on the Mth table. For example, when Pointer M is the routine which chooses the description data of a hairstyle by [1], the contents of the y register are changed on the 1st table. Since the description data (for example, parts pattern) of a hairstyle according to age are contained in the 1st table, it is changed into the parts pattern of a hairstyle according to the age (the contents of the y register) when it was inputted at this time.
[0034] Subsequently, the data (parts pattern) changed at step S60 are stored in the lower bit group c of the area which makes an address (OFFSET4+M) the address. For example, when Pointer M is the routine which chooses the description data of a hairstyle by [1], the parts pattern of a hairstyle according to age is stored in the lower bit group c. Thereby, it becomes possible to display the description corresponding to age about a hairstyle. Similarly, when Pointer M is the routine which chooses the description data of the profile of a face by [2], the parts pattern of a profile according to age is stored in the lower bit group c. Moreover, when Pointer M is the routine which chooses the description data of an eye by [3], the parts pattern of an eye according to age is stored in the lower bit group c.

[0035] Subsequently, it distinguishes whether Pointer M was incremented at step S61, and Pointer M was set to [7] at step S62. This judges whether selection of a hairstyle, a profile, an eye, and all six description data of .... was completed as description data of a face. If it is not M= [7], it will return to step S56 and the same loop formation will be repeated. And if Pointer M is in the range of [4] - [6] at step S56 when there is no pointer M in the range of [1] - [3] namely, it will branch to step S64. It becomes the processing to the description data of a face without the need of making it changing like a comparison of those other than a hairstyle, a profile, and an eye corresponding to age at this time. Therefore, at step S64, a predetermined value is stored in the lower bit group c of the area which makes an address the address (OFFSET4+M). A predetermined value is stored because description data other than a hairstyle, a profile, and an eye are fixed to a fixed condition. For example, when Pointer M is the routine which chooses the description data of a supercilium by [4], the parts pattern of the supercilium of a fixed configuration is stored in the lower bit group c irrespective of age. Subsequently, Pointer M is incremented at step S61, and step S62 is distinguished. Thus, this routine will be ended, if the above-mentioned loop formation is repeated and it becomes M= [7] until it becomes M= [7].
[0036] Drawing 11 is a flow chart which shows a cursor switch interruption routine. If the cursor switch 3 is operated, it will shift to this cursor switch interruption routine. If it shifts to this interruption routine, it will distinguish whether image data is under display at step S80 first (for example, it judges with a display flag). This is because cursor has not appeared if it does not judge whether a certain screen is displayed on the display 11 and the screen is not displayed. Therefore, if image data is not [be / it] under display, the return of this routine will be carried out.
[0037] On the other hand, when image data is under display, it progresses to continuing step S82, and the data of the address (M+OFFSET2) of a work piece RAM 7 are changed according to a cursor location. (OFFSET2) Since an address stores the data corresponding to a cursor location, the data of an address (OFFSET 2+1) are changed according to a cursor location about a hairstyle at the time of M= 1, for example. Moreover, the data of an address (OFFSET 2+2) are changed according to a cursor location about a profile at the time of M= 2. For example, in order to choose a parts pattern, when the cursor switch 3 is operated, one of the variations of various kinds of parts patterns about a profile as shown in drawing 2 is chosen by the car sol.
[0038] Subsequently, the display of a cursor location is changed at step S84. Thereby, when the cursor switch 3 is operated and moved, the display position is changed and it is shown in a screen. Subsequently, it distinguishes whether Pointer M is [1] at step S86. That is, it distinguishes whether it is the screen which judges sex. It distinguishes whether it progresses to step S88 and the data of an address (OFFSET2+M) express a man at the time of M= [1]. When it is a thing showing a man, it returns to N= 1 at step S90 first. N is a sex pointer. This is for carrying out sequential increment of the sex pointer N from the area corresponding to the minimum value, i.e., (OFFSET 2+1), an address. (OFFSET4+M) The sex parameter with which the data with which an address expresses the description of a face are stored, and distinguish a male or a woman to most significant bit MSB (part shown by a) of the data is stored. A sex parameter is 1 bitwise, expresses a male at the time of "1", and expresses a woman at the time of "0."
[0039] Subsequently, it progresses to step S92 and MSB of the data of an address (OFFSET4+N) is set to "1." Since it is N= 1 at this time, MSB of the data of an address will be set to "1" first (OFFSET 4+1). Subsequently, the sex pointer N is incremented at step S94. This is set to N= 2. Subsequently, it distinguishes whether it was set to N= 7 at step S96. N= 7 is judged for setting the MSB to "1" to the maximum address of an address (OFFSET4+N). Since it is not N= 7, it returns to step S92 and the same processing is repeated this time. Therefore, since it is N= 2 shortly, MSB of the data of an address (OFFSET 4+2) is set to "1." the following -- the same -- carrying out -- an address (OFFSET 4+3) and ... (OFFSET 4+6) -- MSB of each data of an address is set to "1", respectively.
[0040] And if set to N= 7 at step S96, this cursor switch interruption routine will be ended and a return will be carried out to a main program. the time of on the other hand Pointer M not being [1] at step S86 -- step S106 -- jumping -- the contents of the address (OFFSET2+M) -- {(OFFSET4+(M-1)] it transmits to the high-order-bit group b except MSB of the data of an address.) By this, the contents of data of the location specified by the cursor

switch 3 will be transmitted to the area which stores the description data of a face. If it passes through step S106, a cursor switch interruption routine will be ended and a return will be carried out to a main program. Moreover, when it is what the data of the time of NO, i.e., (OFFSET2+M), an address, do not express a man with step S88, and expresses a woman, it progresses to step S98 and the sex pointer N is returned to N= 1. This is for carrying out sequential increment of the sex pointer N from the area corresponding to the minimum value, i.e., (OFFSET 2+1), an address.

[0041] Subsequently, MSB of the data of an address (OFFSET4+N) is set to "0" at step S100. Since it is N= 1 at this time, MSB of the data of an address will be set to "0" first (OFFSET 4+1). Subsequently, the sex pointer N is incremented at step S102. This is set to N= 2. Subsequently, it distinguishes whether it was set to N= 7 at step S104. N= 7 is judged for setting the MSB to "0" to the maximum address of an address (OFFSET4+N). Since it is not N= 7, it returns to step S100 and the same processing is repeated this time. Therefore, since it is N= 2 shortly, MSB of the data of an address (OFFSET 4+2) is set to "0." the following -- the same -- carrying out -- an address (OFFSET 4+3) and ... (OFFSET 4+6) -- MSB of each data of an address is set to "0", respectively. And if set to N= 7 at step S104, this cursor switch interruption routine will be ended and a return will be carried out to a main program.

[0042] Drawing 12 is a flow chart which shows a display switch interruption routine. If the display switch 4 is operated, it will shift to this display switch interruption routine. If it shifts to this interruption routine, a display flag will be first reversed at step S150. Therefore, a display flag is reversed whenever the display switch 4 is operated. For example, at first, if a display flag is "0" and it is operated, a display flag will be set to "1" and "0" and "1" will be henceforth repeated for every actuation. Thus, it judges whether the display switch 4 was operated to the last routine.

[0043] Subsequently, it distinguishes whether a display flag is "1" at step S152. "1" is the case of the first routine in a display flag. The screen data which branched to step S154 at this time, set to M1=1, and made the start address the contents stored further (OFFSET 1+1) in the address are transmitted to VRAM9. At this time, the data of the address in a work piece RAM 7 (OFFSET 1+1) are ADD1, and the screen data corresponding to the address of ADD1 are a screen which chooses sex. Therefore, a screen as shown in drawing 9 (a) at first corresponding to ADD1 is displayed on a display 11. According to this screen, an operator operates the cursor switch 3 and specifies either [01]:males or [02]:woman. If it passes through step S154, a return will be carried out to a main program.

[0044] On the other hand, since a display flag is reversed whenever the display switch 4 is operated after ending the first routine, the distinction result of step S152 is set to YES, and progresses to step S156 next time. At step S156, Pointer M is returned to [1]. Since a hairstyle corresponds in a pointer M= 1 and a profile and M= 3 correspond like an eye and .... in M= 2, returning Pointer M to [1] at step S156 chooses the description data of a hairstyle first, and, subsequently it is for making sequential selection and displaying the description data (for example, parts pattern) according to age from a profile.

[0045] Subsequently, it distinguishes whether Pointer M is [3] at step S158. M= [3] specifies the description data of an eye. Since only an eye has the description of going up according to age and this is inconvenient by having displayed as it is, it is for changing the location. Therefore, if it is not M= [3], it will judge that it is not the routine which specifies the description data of an eye, and will progress to step S160, and the screen data which made the start address the contents stored in the address (OFFSET4+M) will be transmitted to VRAM9. At this time, the data of the address in a work piece RAM 7 (OFFSET4+M) are area which stores the description data for a face. The face image according to description data other than an eye is displayed on a display 11.

[0046] Subsequently, Pointer M is incremented at step S162, and it distinguishes whether Pointer M is [7] at step S164. This judges whether selection of a hairstyle, a profile, and all six description data of an eye was completed as description data of a face. If it is not M= [7], it will return to step S158 and the same loop formation will be repeated. If it becomes M= [3] at step S158 at this time, processing which branches to step S166 and displays the description data of an eye will be performed. That is, at step S166, the contents of 3rd OFFSET are transmitted to y register. That is, age data are transmitted.

[0047] Subsequently, the y-coordinate of the screen data which read the screen data which made the start address the contents stored in the address (OFFSET4+M) at step S168 one by one, and were read at step S170 is changed based on the contents of the y register, and it transmits to VRAM9. Thereby, about an eye, the location (especially y-coordinate location) changes according to age, and a suitable face image is displayed on age by the display 11. Generally, if age goes up, since it is in an inclination which the location of an eye goes up, along with it, the location of an eye will become the face image corrected according to age. If it passes through step S170, it will progress to step S162.

[0048] Thus, if the above-mentioned processing is repeated in the range of [1] - [6] and Pointer M becomes M= [7] at step S164, it will progress to step S172. At step S172, it distinguishes whether the value of y register is smaller than [30]. This judges whether assignment of age is less than 30 years old. If age is less than 30 years old, since possibility that a wrinkling is in a face is low, this routine is ended and a return is carried out to a main program. On the other hand, at step S172, the value of y register is more than [30], and when assignment of age is 30 or more years old, it progresses to step S174. At step S174, the y-coordinate of the screen data which read the screen data which made the start address the contents (namely, wrinkling of an outer canthus) stored in 5th OFFSET one by one, and were read at step S176 is changed based on the contents of the y register, and it transmits to VRAM9. Thereby, about the wrinkling of an outer canthus, a number and its location (especially y-coordinate location) change according to the age of 30 or more years old less than 40 years old, and the face image which has the

wrinkling of a suitable outer canthus of age is displayed on a display 11. if age goes up and the number of the wrinkling of an outer canthus will generally increase -- being also alike -- since it is in the inclination for the location of the wrinkling of an outer canthus to change, it becomes the face image by which the number and location of a wrinkling of an outer canthus were corrected along with it.
[0049] Subsequently, it progresses to step S178 and distinguishes whether the value of y register is smaller than [40]. This judges whether assignment of age is less than 40 years old at the age of 30 or more. If age is less than 40 years old, possibility that a wrinkling is in a frame is higher than 30 years old, but since there are few wrinklings compared with 50 years old, wrinkling processing of a frame is performed in 30 years old - 40 years old this time. This routine is ended at step S178 at the time of YES, i.e., when assignment of age is 40 or more years old, and a return is carried out to a main program. On the other hand, when assignment of age is less than 40 years old at the age of 30 or more, the screen data which made the start address the contents (namely, wrinkling of a frame) which progressed to step S180 and were stored in the address (OFFSET 5+1) are transmitted to VRAM9. Thereby, about the wrinkling of a frame, the number changes according to the age of 30 or more years old less than 40 years old, and the face image which has the wrinkling of a suitable frame of age is displayed on a display 11. Generally, if age goes up, since it is in the inclination for the number of the wrinkling of a frame to increase, it will become the face image by which the number of the wrinklings of a frame was corrected along with it.
[0050] Subsequently, it progresses to step S182 and distinguishes whether the value of y register is smaller than [50]. This judges whether assignment of age is less than 50 years old at the age of 40 or more. If age is less than 50 years old, possibility that a wrinkling is in the cheek of a face is higher than 40 years old, but since there are few wrinklings compared with 60 years old, wrinkling processing of a cheek is performed in 40 years old - 50 years old this time. This routine is ended at step S182 at the time of YES, i.e., when assignment of age is 50 or more years old, and a return is carried out to a main program. On the other hand, when assignment of age is less than 50 years old at the age of 40 or more, the screen data which made the start address the contents (namely, wrinkling of a cheek) which progressed to step S184 and were stored in the address (OFFSET 5+2) are transmitted to VRAM9. Thereby, about the wrinkling of a cheek, the number changes according to the age of 40 or more years old less than 50 years old, and the face image which has the wrinkling of a suitable cheek of age is displayed on a display 11. Generally, if age goes up, since it is in the inclination for the number of the wrinkling of a cheek to increase, it will become the face image by which the number of the wrinklings of a cheek was corrected along with it. If it passes through step S182, this routine will be ended and a return will be carried out to a main program.
[0051] Thus, at this example, if a power source is switched on to this equipment, while an early face image is displayed on a display 11, carries out based on the image and corrects to it at first, the face image of 30 years old of arbitration (basic face image) will be created and displayed in the combination of each parts pattern by manual selection. An example of the face image of 30 years old is shown like drawing 13 (a), and is using the male face image as the model here. Then, if the age input key 5 is operated, for example, the age of 10 years old is inputted, among each parts of the face image (basic face image) of 30 years old, the parts pattern of an eye moves to the location of the bottom which responded to 10 years old, it will carry out [that a hairstyle is changed into the hairstyle according to 10 years old, etc. and], and a suitable face image will be automatically created by the face of 10 years old as shown in drawing 13 (d).
[0052] Moreover, if the age input key 5 is operated, for example, the age of 40 years old is inputted The parts pattern of an eye moves to the upper location a little among each parts of the face image (basic face image) of 30 years old. The wrinkling of an outer canthus is added (the location of an outer canthus is also moved a little), a hairstyle is changed into the hairstyle according to 40 years old, it carries out [that the wrinkling of the circumference of opening is added further, etc. and], and a suitable face image is automatically created by the face of 40 years old as shown in drawing 13 (b).
[0053] On the other hand, the age input key 5 is operated as an example which age went up with great force. When the age of 65 years old is inputted, for example, the inside of each parts of the face image (basic face image) of 30 years old, The parts pattern of an eye moves to the upper location further, the wrinkling of an outer canthus is added further (the location of an outer canthus is also moved), and a hairstyle is changed into the hairstyle according to 65 years old, and it carries out [that the wrinkling of the circumference of opening is added further, etc. and], and a suitable face image is automatically created by the face of 65 years old as shown in drawing 13 (c).
[0054] Therefore, a suitable face image can be created quickly and easily of age, without needing special skill. Moreover, an inconsistency with the age grasped as the age subjectively grasped from the created face image objective can be evaluated objective. in addition, by carrying out the partition by sex, even if it boils and attaches a female face, the face image according to age can be automatically created by the same processing. Moreover, even if a face image may be its face or is others' face, it can completely create the face image according to age automatically similarly. Furthermore, the face image according to age is displayed by the display 11, and also printing section 11A is prepared, and you may make it print in a label tape, a regular paper, etc. by this printing section 11A.
[0055]
[Effect of the Invention] If the data about age are specified with an assignment means according to invention according to claim 1 By reading the face description data according to the data concerned from the face description data storage means, and reading and combining the parts pattern for every parts which corresponds from a parts pattern storage means according to the face description data A suitable face image can be created quickly and easily of age, without needing special skill, since the face image (for example, its face or others' face) is creating automatically. Moreover, an inconsistency with the age grasped as the age subjectively grasped from the created

face image objective can be evaluated objective.
[0056] According to invention according to claim 5, beforehand A face image (for example, one's face or others' face), If the age of the face is registered as a basic face image and other different age from the age is specified Age difference data are outputted from the data about the age memorized for the age data storage means. It is based on the face description data memorized for this age difference data and the face description data storage means. The face description data memorized for the face description data storage means are changed, and a basic face image is corrected based on this changed face description data. A new face image suitable of that age The face of the past when the precision relevant to a basic face is high, or the anticipation face of the future can be created simply and quickly, without needing special skill, since he is trying to create automatically for example, (the past face or the anticipation face of the future).

[Translation done.]

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2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram of one example of the face image listing device concerning this invention.
[Drawing 2] It is drawing showing an example of the parts pattern for every parts memorized on the parts screen ROM of this example.
[Drawing 3] It is drawing showing an example of the variation of the profile pattern of this example.
[Drawing 4] It is drawing showing an example of the face description data according to the age of this example.
[Drawing 5] It is the flow chart which shows the main program of face image creation processing of this example.
[Drawing 6] It is the flow chart which shows the description switch interruption routine of this example.
[Drawing 7] It is drawing showing an example of the data storage area of the work piece RAM of this example.
[Drawing 8] It is drawing showing an example of the screen data for every parts memorized on the parts screen ROM of this example.
[Drawing 9] It is drawing showing an example of the display screen of this example.
[Drawing 10] It is the flow chart which shows the age switch interruption routine of this example.
[Drawing 11] It is the flow chart which shows the cursor switch interruption routine of this example.
[Drawing 12] It is the flow chart which shows the display switch interruption routine of this example.
[Drawing 13] It is drawing showing an example of the creation face image of this example.
[Description of Notations]
1 CPU (Face Image Creation Means, Age Difference Output Means, the Face Description Data Origination Means)
2 The Description Switch
3 Cursor Switch
4 Display Switch
5 Age Input Key (Assignment Means)
6 Program ROM
7 Work Piece RAM
8 Parts Screen ROM (Parts Pattern Storage Means, Face Image Data Storage Means, Age Data Storage Means, the Face Description Data Storage Means)
9 VRAM
10 Table ROM (the Face Description Data Storage Means)
11 Display (Display Means)
11A Printing section (printing means)

[Translation done.]

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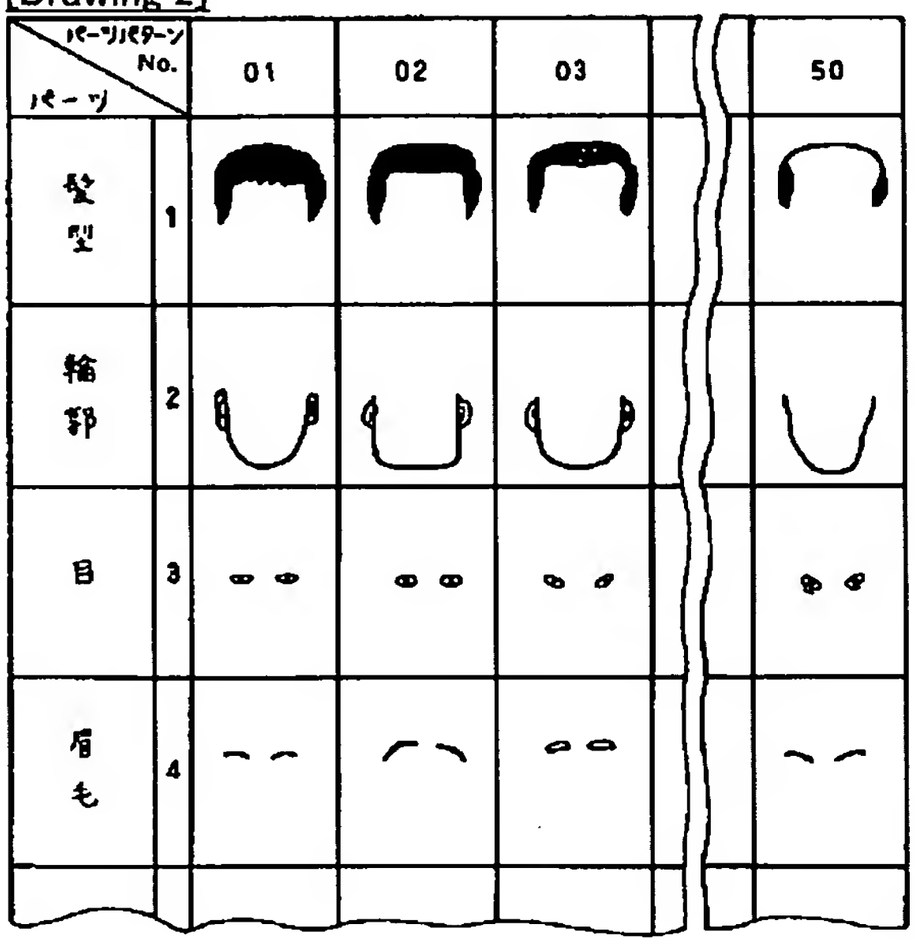
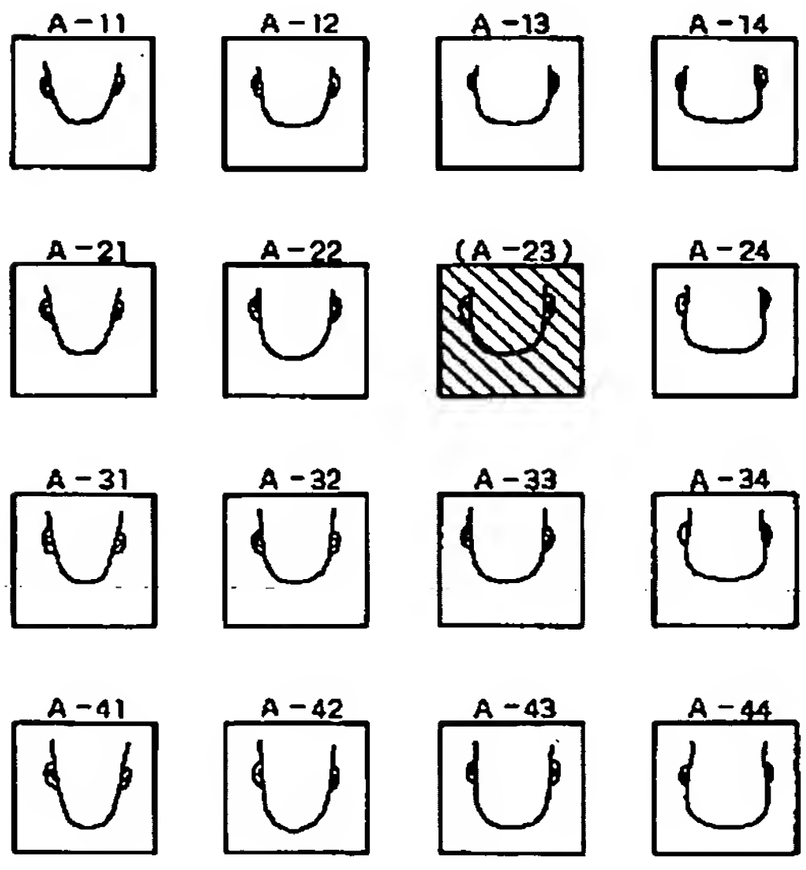
3.In the drawings, any words are not translated.

DRAWINGS

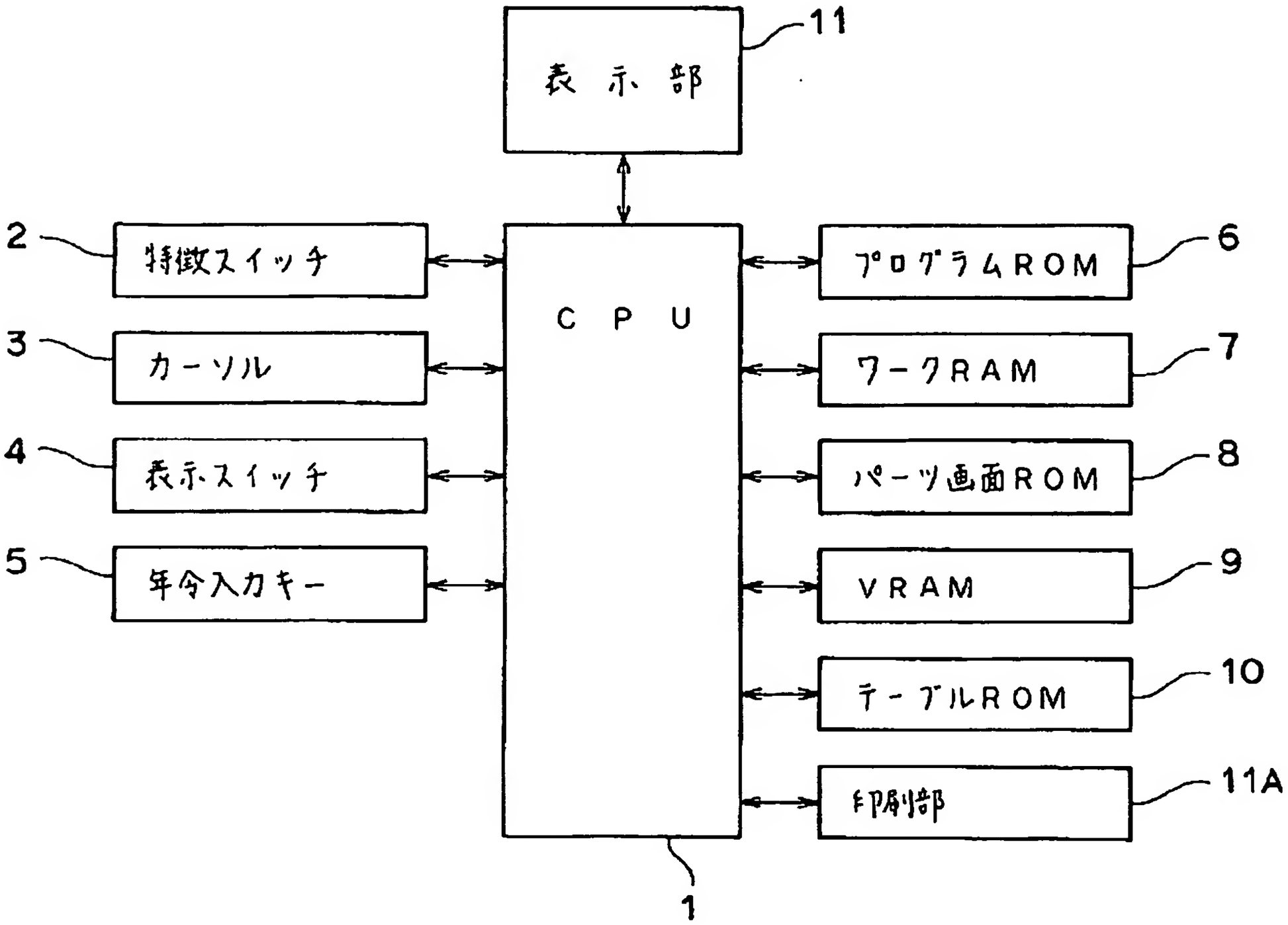
[Drawing 2]



[Drawing 3]
（パーツパターンNo. 03 のバリエーション）



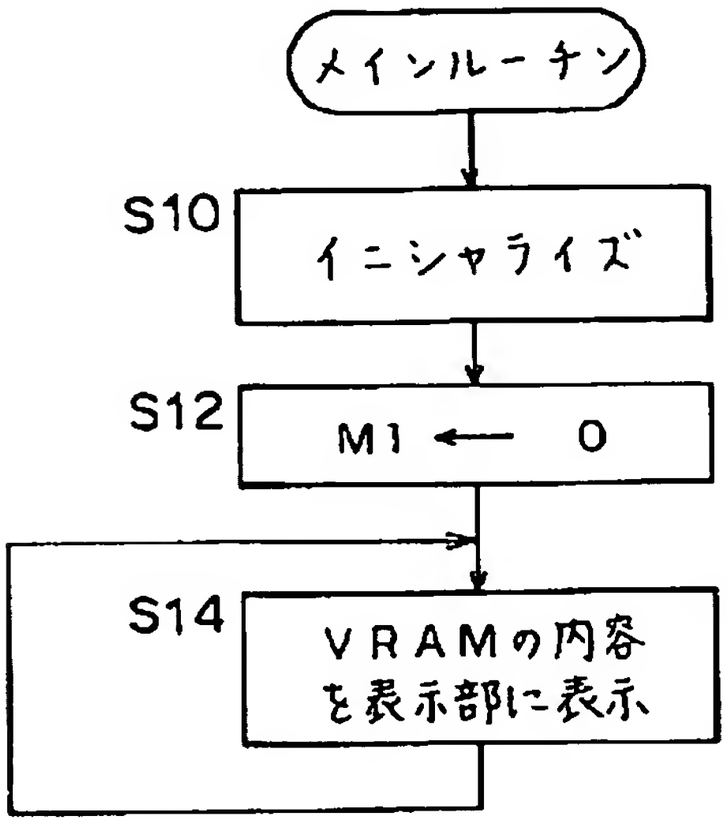
[Drawing 1]



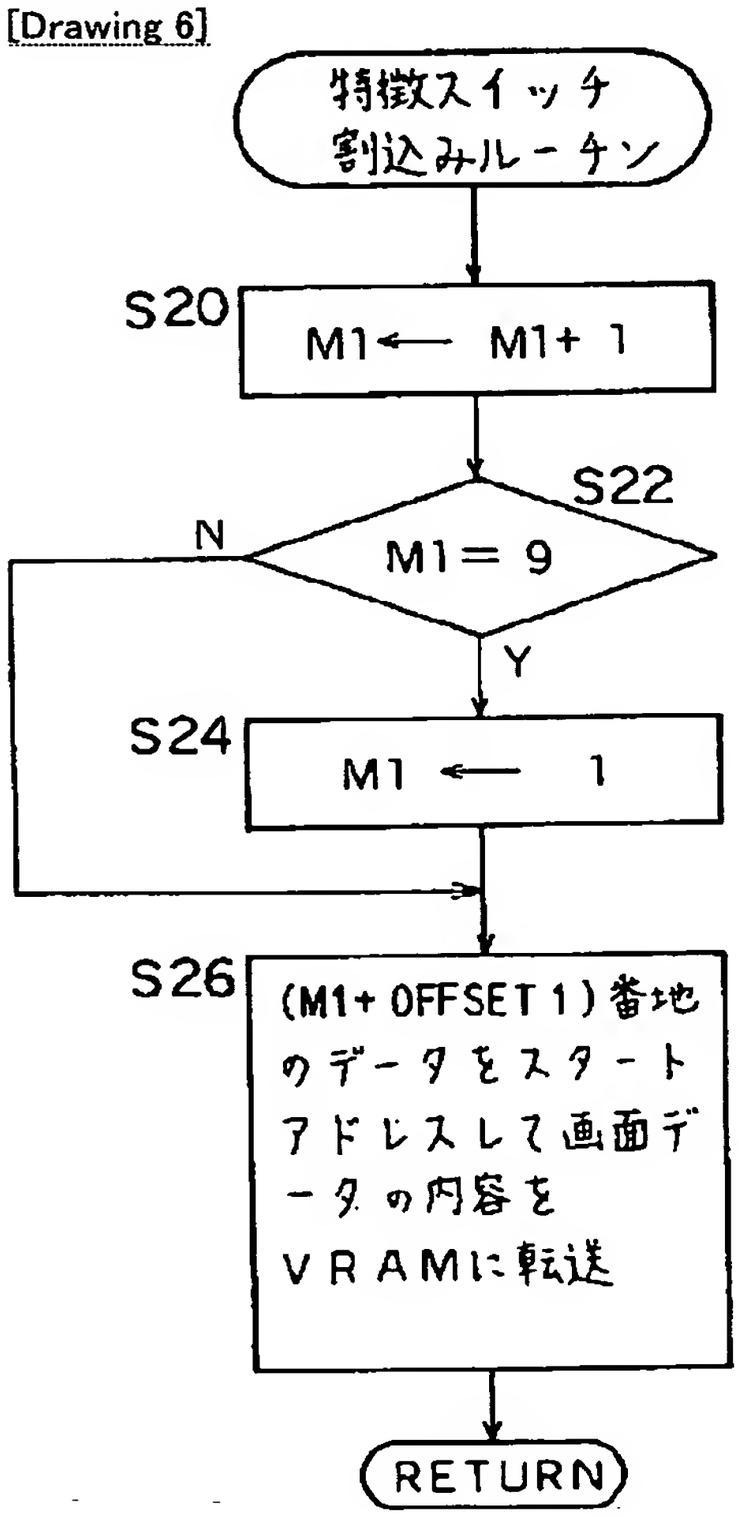
[Drawing 4]

年令(歳) / パーツ	30	35	40		100
目尻のしわ	(なし)	～	～		
額のしわ	(なし)	―	―		
頬のしわ	(なし)	( )	( )		

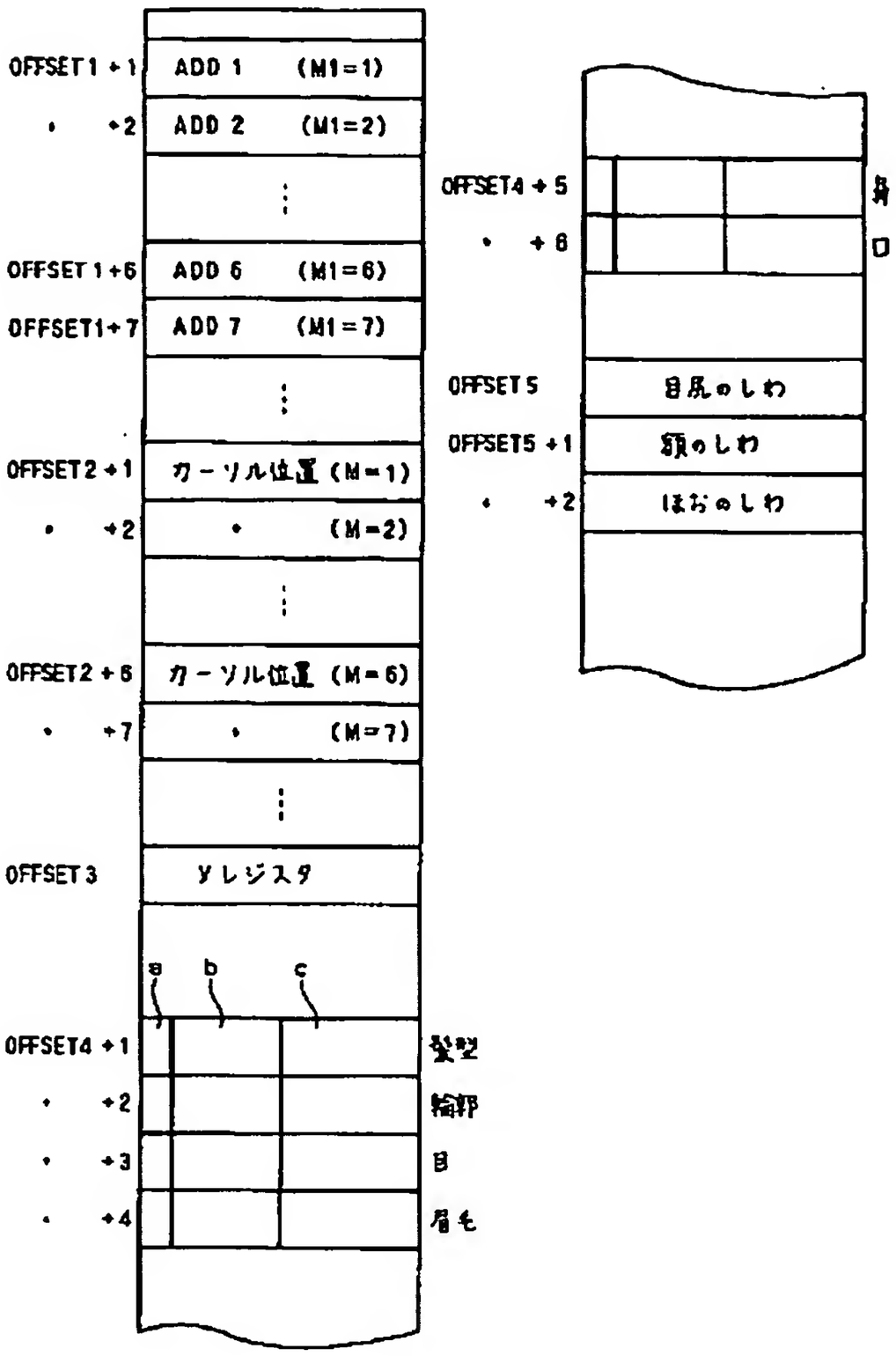
[Drawing 5]



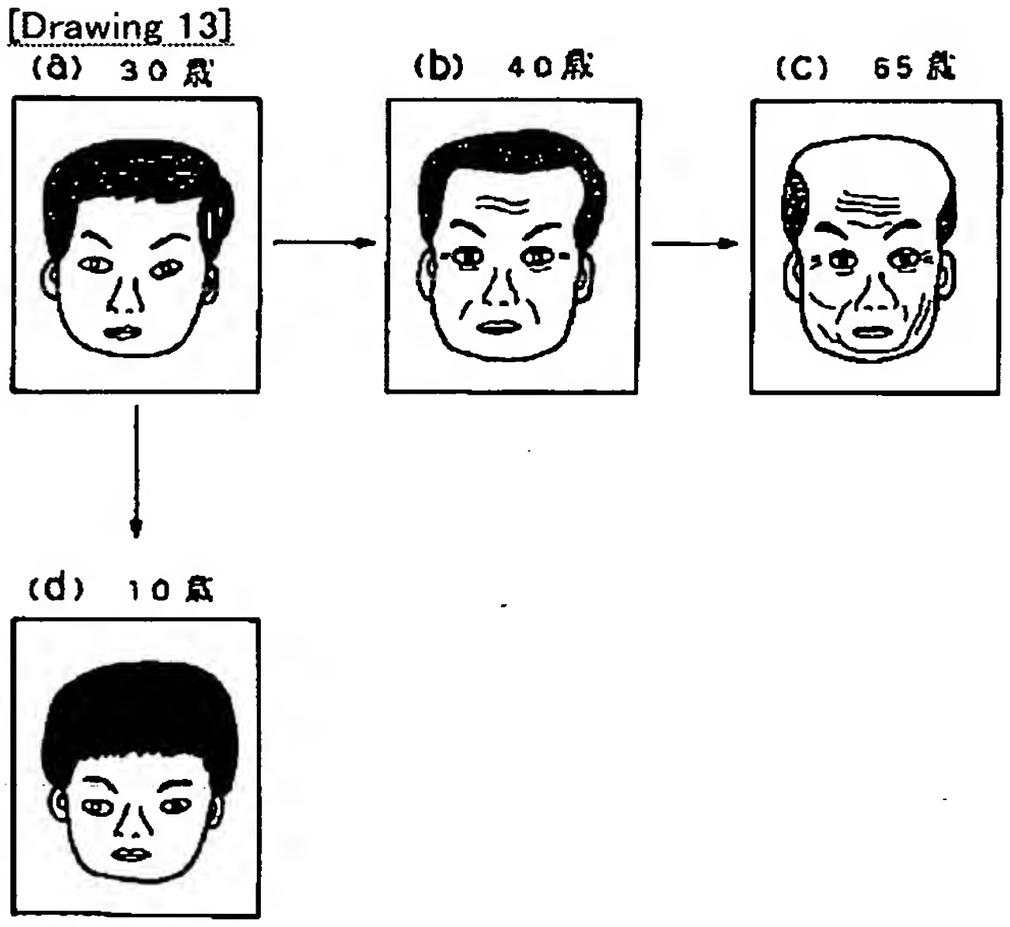
[Drawing 6]



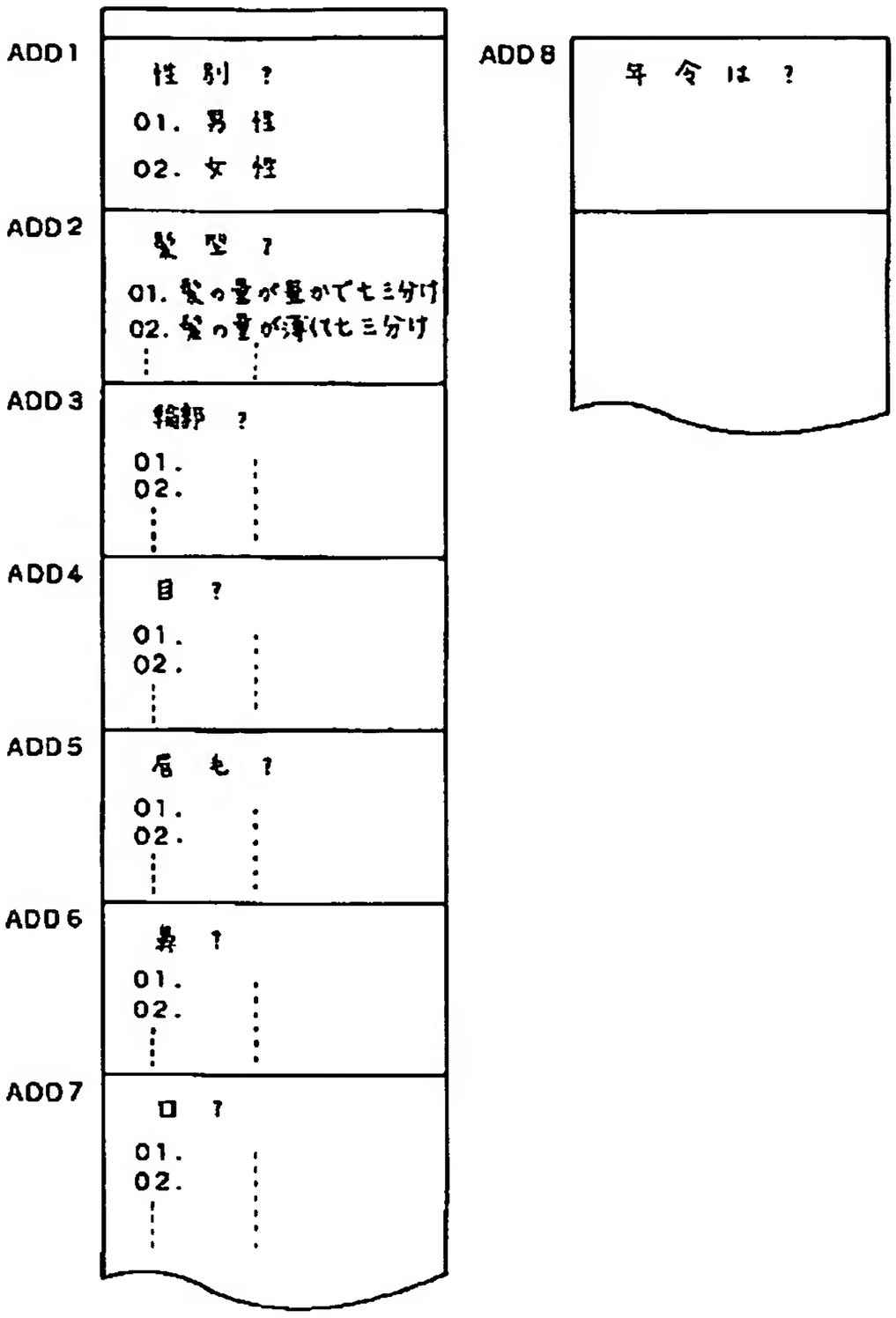
[Drawing 7]



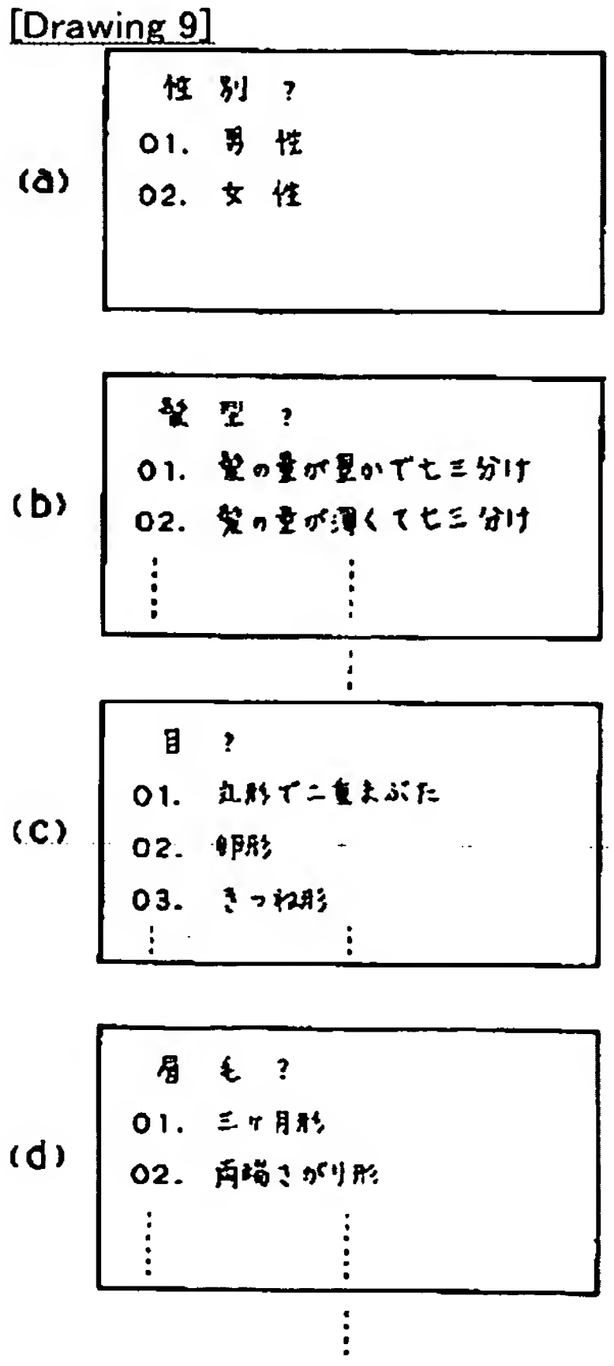
[Drawing 13]



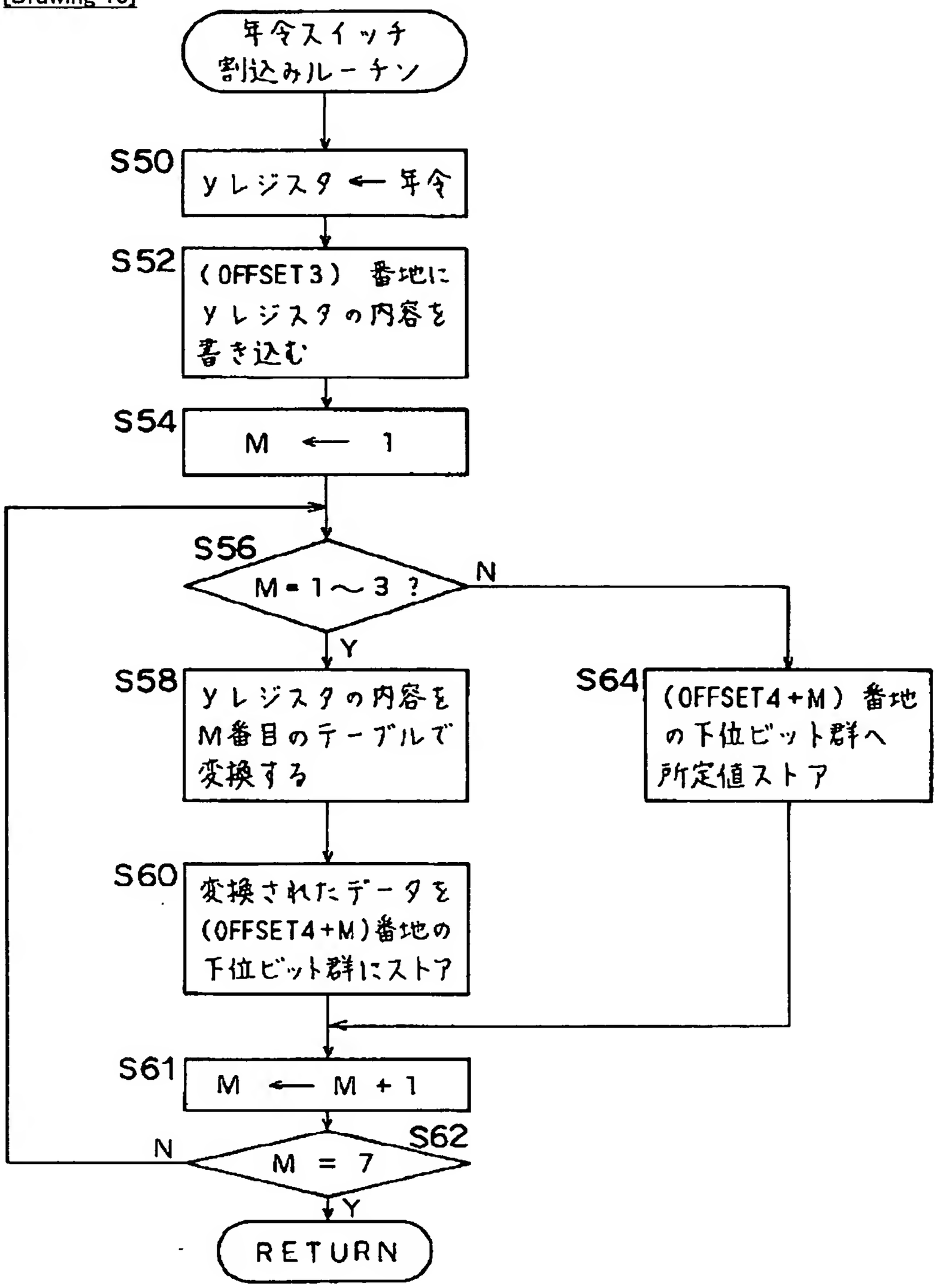
[Drawing 8]


ADD1
性別？
01. 男性
02. 女性
ADD2
髪型？
01. 髪の量が量かで七三分け
02. 髪の量が薄くて七三分け
ADD3
輪郭？
01.
02.
ADD4
目？
01.
02.
ADD5
眉毛？
01.
02.
ADD6
鼻？
01.
02.
ADD7
口？
01.
02.
ADD8
年令は？

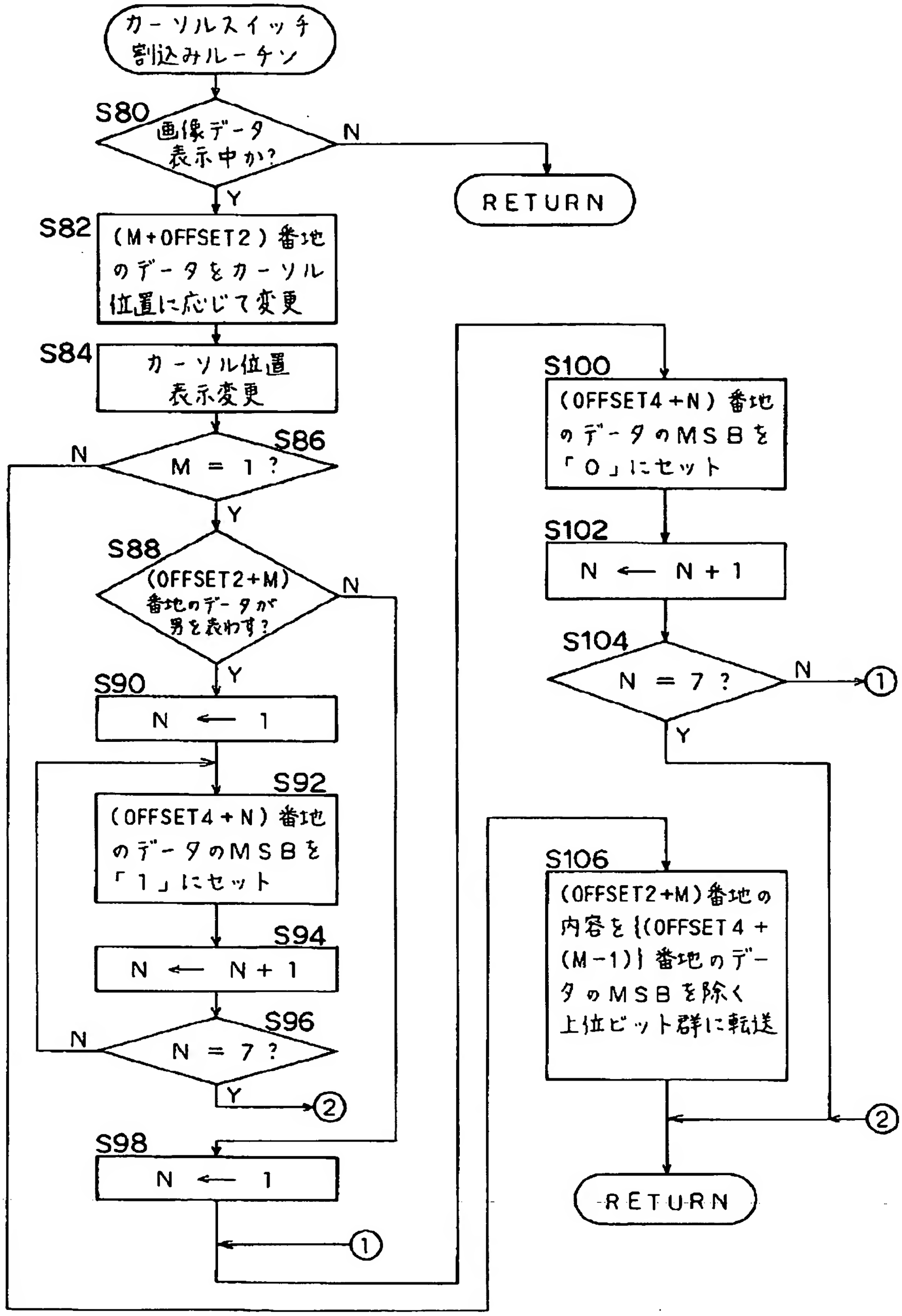
[Drawing 9]


(a)
性別？
01. 男性
02. 女性
(b)
髪型？
01. 髪の量が量かで七三分け
02. 髪の量が薄くて七三分け
(c)
目？
01. 丸形で二重まぶた
02. 卵形
03. きつね形
(d)
眉毛？
01. 三ヶ月形
02. 両端さがり形

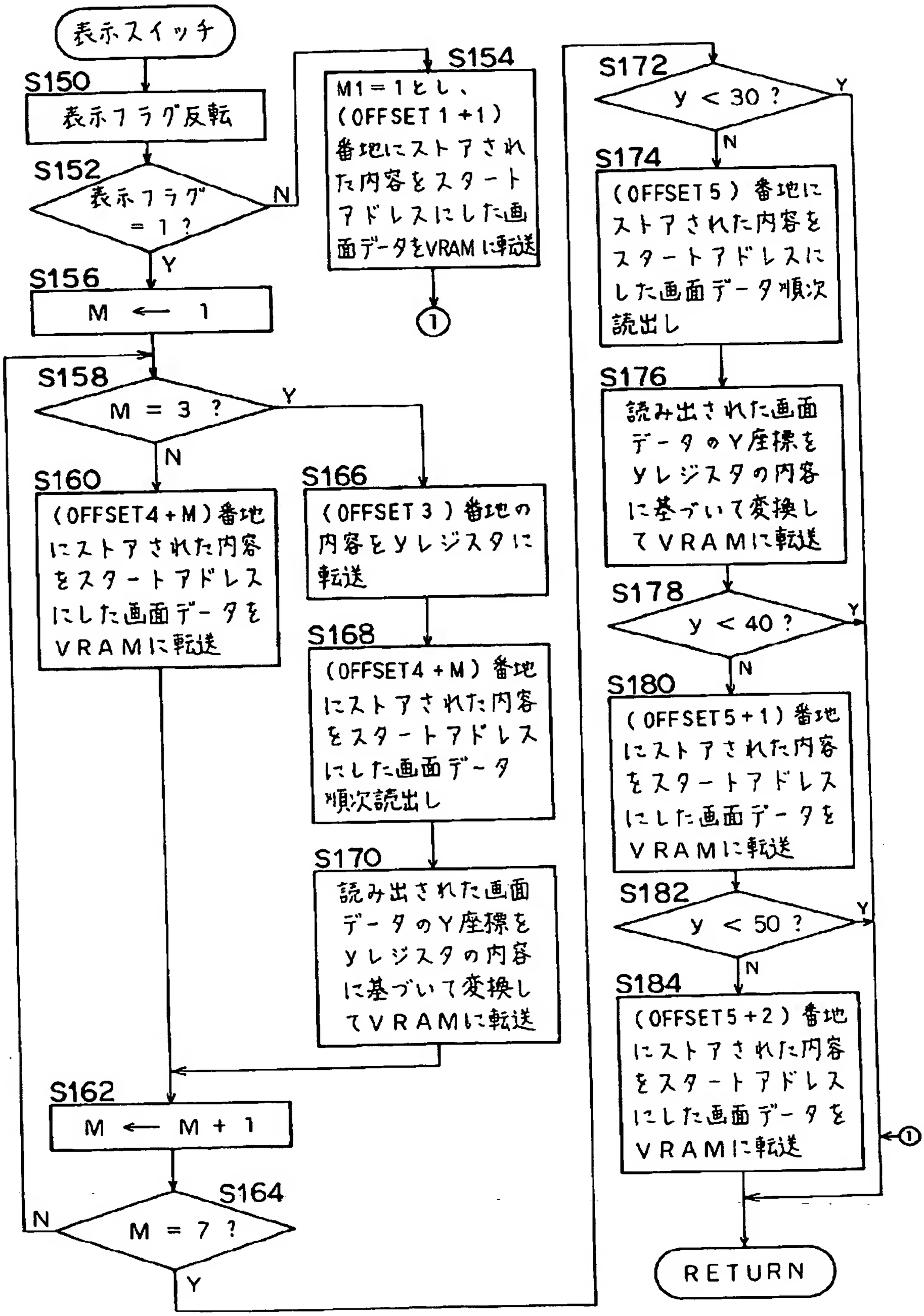
[Drawing 10]



[Drawing 11]


カーソルスイッチ割込みルーチン
S80
画像データ表示中か?
N
Y
RETURN
S82
(M+OFFSET2)番地のデータをカーソル位置に応じて変更
S84
カーソル位置表示変更
S86
M = 1 ?
N
Y
S88
(OFFSET2+M)番地のデータが男を表わす?
N
Y
S90
N ← 1
S92
(OFFSET4+N)番地のデータのMSBを「1」にセット
S94
N ← N + 1
S96
N = 7 ?
N
Y
②
S98
N ← 1
①
S100
(OFFSET4+N)番地のデータのMSBを「0」にセット
S102
N ← N + 1
S104
N = 7 ?
N
①
Y
S106
(OFFSET2+M)番地の内容を{(OFFSET4+(M-1)}番地のデータのMSBを除く上位ビット群に転送
②
RETURN

[Drawing 12]



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CORRECTION OR AMENDMENT

[Kind of official gazette] Printing of amendment by the convention of 2 of Article 17 of Patent Law
[Section partition] The 3rd partition of the 6th section
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[Title of the Invention] Face image listing device
[Claim(s)]
[Claim 1] A parts image storage means by which each parts image showing a face image is memorized,
A face description data storage means by which match with the data about age and the face description data are memorized,
An assignment means to specify the data about age,
The face image listing device characterized by to have a face image creation means reads the face description data corresponding to the data about the age specified by this assignment means from said face description data-storage means, reads the parts image which corresponds from said parts image storage means according to this face description data of that, and create a face image combining each [these] parts image.
[Claim 2] A face image storage means to memorize the face image constituted combining each parts image,
An age storage means to memorize the data about the age corresponding to the face image memorized by this face image storage means,
A face description data storage means to memorize the face description data according to age,
An assignment means to specify the data about age,
An age difference output means to output age difference data based on the data about the age memorized by these specified tbe data and said age storage means if the data about age are specified by this assignment means,
if a face image is read from said face image storage means and a basic face image is created -- being also alike --
It is based on the face description data memorized by the age difference data outputted from said age difference output means, and said face description data storage means. The face image listing device characterized by having a face description data origination means to change the face description data memorized by said face description data storage means, to correct the face image which is to said base based on this changed face description data, and to create a new face image.
[Claim 3] A parts image storage means by which two or more parts images showing a face image are memorized by matching with the data about age,
An assignment means to specify the data about the age of a face image to create,
The face image listing device characterized by having a face image creation means to read each parts image corresponding to the data about the age specified by this assignment means from said parts image storage means,

and to create a face image combining each of this read parts image.
[Claim 4] The 1st display-control means on which the 1st face image which consists of combination of two or more parts images is displayed,
An assignment means to specify the data about age,
A face image creation means to replace at least one parts image in the 1st face image currently shown by control of said 1st display-control means based on the data about the age specified by this assignment means, and to create the 2nd face image corresponding to the data about said specified age,
The face image listing device characterized by having the 2nd display-control means on which the 2nd face image created by this face image creation means is displayed.
[Claim 5] The 1st display-control means on which the 1st face image is displayed, and an assignment means to specify the data about age,
The face image listing device characterized by having the 2nd display-control means on which the 1st face image currently shown by control of said 1st display-control means is changed into the 2nd face image corresponding to the data about the age specified by said assignment means, and this 2nd changed face image is displayed.
[Claim 6] Said face description data storage means is a face image listing device according to claim 1 or 2 characterized by having memorized whenever [aspect ratio / of a face /, height / of an eye /, magnitude / of an eye /, number / of a wrinkling /, and retreat / in the hair case] as face description data according to age.
[Claim 7] Said assignment means is a face image listing device given in either of claims 1-5 characterized by specifying at least one of age actual as data about age, and birth dates.
[Claim 8] A face image listing device given in either of claims 1-3 characterized by having further a display output or the output means which carries out a printout for the face image created by said face image creation means.
[Claim 9] Said face image storage means is a face image listing device given in either of claims 1-3 characterized by memorizing the face image about one's face or others' face.
[Claim 10] Said age data storage means is a face image listing device given in either of claims 1-3 characterized by memorizing at least one of of age actual as data about age, a birth date, what year future, and what year after.
[Claim 11] Said face description data-origination means is the face image listing device according to claim 2 characterized by to perform modification of the parts of a profile according to the aspect ratio of a face, modification of the location of an eye, modification of a hairstyle, and the addition of a wrinkling as modification processing of the face description data memorized by said face description data-storage means, and to create the past face or the anticipation face of the future based on this changed face description data.
[Detailed Description of the Invention]
[0001]
[Industrial Application] When this invention specifies age in detail with respect to a face image listing device, it relates to the face image listing device by which a face image suitable of the age is created automatically.
[0002]
[Description of the Prior Art] In order to create a face image conventionally, the graphic display using a microcomputer is used and the face image is created with this equipment by combining the parts image which is a parts pattern with each parts (for example, an eye, eyebrows, opening, etc.) of every [which constitutes a face].
[0003]
[Problem(s) to be Solved by the Invention] However, when creating a face image by the conventional graphic display, and its face was created in the combination of the parts pattern for every parts, it was very difficult to create a face suitable for others' age with the combination of the parts pattern for every parts suddenly at any rate, and it had required the long time for creation. Moreover, special skill was needed in order to have created the face suitable for others' age. Furthermore, there was a trouble that there were many big differences, by the age grasped as the age subjectively grasped from the face image after creating objective.
[0004] Then, this invention aims at offering the face image listing device which can create a suitable face image quickly and easily of age. Moreover, this invention aims at offering the face image listing device which can be evaluated objective for the inconsistency of the age subjectively grasped from a face image, and the age grasped objective.
[0005]
[Means for Solving the Problem] The face image listing device by this invention is equipped with the next configuration for the above-mentioned purpose achievement. That is, the face image listing device concerning claim 1 publication is characterized by having the following. A parts image storage means by which each parts image showing a face image is memorized A face description data storage means by which match with the data about age and the face description data are memorized A face image creation means reads the face description data corresponding to the data about the age specified by assignment means specify the data about age, and this assignment means from said face description data-storage means, reads the parts image which corresponds from said parts image storage means according to this face description data of that, and create a face image combining each [these] parts image Moreover, the face image listing device concerning claim 2 is characterized by having the following. A face image storage means to memorize the face image constituted combining each parts image An age storage means to memorize the data about the age corresponding to the face image memorized by this face image storage means A face description data storage means to memorize the face description data according to age, and an assignment means to specify the data about age, An age difference output means to output age difference data based on the data about the age memorized by these specified tbe data and said age storage means if the data about age are specified by this assignment means, if a face image is read from said face image storage means and a

basic face image is created — being also alike — It is based on the face description data memorized by the age difference data outputted from said age difference output means, and said face description data storage means. A face description data origination means to change the face description data memorized by said face description data storage means, to correct the face image which is to said base based on this changed face description data, and to create a new face image Moreover, the face image listing device concerning claim 3 is characterized by having the following. A parts image storage means by which two or more parts images showing a face image are memorized by matching with the data about age An assignment means to specify the data about the age of a face image to create A face image creation means to read each parts image corresponding to the data about the age specified by this assignment means from said parts image storage means, and to create a face image combining each of this read parts image

[0006] Moreover, the face image listing device concerning claim 4 is characterized by having the following. The 1st display-control means on which the 1st face image which consists of combination of two or more parts images is displayed An assignment means to specify the data about age Based on the data about the age specified by this assignment means, at least one parts image in the 1st face image currently shown by control of said 1st display-control means is replaced. A face image creation means to create the 2nd face image corresponding to the data about said specified age, and the 2nd display-control means on which the 2nd face image created by this face image creation means is displayed

[0007] Moreover, the face image listing device concerning claim 5 is characterized by having the following. The 1st display-control means on which the 1st face image is displayed An assignment means to specify the data about age The 2nd display-control means on which the 1st face image currently shown by control of said 1st display-control means is changed into the 2nd face image corresponding to the data about the age specified by said assignment means, and this 2nd changed face image is displayed

[0008] Moreover, you may make it said face image data storage means memorize the face image data about its face or others' face as a desirable mode. You may make it said age data storage means memorize at least one of of age actual as data about age, a birth date, what year future, and what year after. You may make it said face description data storage means memorize whenever [aspect ratio / of a face /, height / of an eye /, magnitude / of an eye /, number / of a wrinkling /, and retreat / in the hair case] as face description data according to age. You may make it said assignment means specify at least one of of age actual as data about age, a birth date, what year future, and what year after. Said face description data origination means performs modification of the parts of a profile according to the aspect ratio of a face, modification of the location of an eye, modification of a hairstyle, and the addition of a wrinkling as modification processing of the face description data memorized by said face description data storage means, and you may make it create the past face or the anticipation face of the future based on this changed face description data. You may make it have further a means to display or print the new face image created by said face description data origination means.

[0009]

[Function] In invention according to claim 1, if the data about age are specified with an assignment means, a face image (for example, its face or others' face) will be automatically created by reading the face description data according to the data concerned from the face description data storage means, reading the parts image for every parts which corresponds from a parts pattern storage means according to the face description data, and combining. Therefore, a suitable face image can be created quickly and easily of the specified age, without needing special skill.

[0010] By invention according to claim 2, it is a face image (for example, its face or others' face) beforehand, If the age at that time is registered and other different age from the age is specified Age difference data are outputted from the data about the age memorized by the age data storage means. This age difference data, It is based on the face description data memorized by the face description data storage means. The face description data memorized by the face description data storage means are changed, a basic face image is corrected based on this changed face description data, and a suitable new face image (for example, the past face or the anticipation face of the future) is automatically created by that age. Therefore, the face of the past when precision is high, or the anticipation face of the future can be created simply and quickly, without needing special skill.

[0011]

[Example] Hereafter, the example of this invention is explained with reference to a drawing. Drawing 1 is the block diagram showing one example of the face image listing device concerning this invention. In drawing 1, a face image listing device is roughly divided and is constituted by CPU1, the description switch 2, the cursor switch 3, the display switch 4, the age input key 5, a program ROM 6, a work piece RAM 7, the parts screens ROM8 and VRAM9, a table ROM 10, and the display 11. If CPU1 controls the whole equipment and assignment actuation of the parts of a face, the description, etc. is performed by the description switch 2, the cursor switch 3, the display switch 4, and the age input key 5, Processing which creates a face image (for example, its face or others' face) is performed by reading the face description data according to age data from a table ROM 10, and reading and combining the parts pattern for every parts which corresponds from the parts screen ROM 8 according to the face description data according to the program stored in the program ROM 6 according to the actuation information. CPU1 has a function as a face image creation means.

[0012] The description switch 2 specifies in order each parts (for example, a hairstyle, the profile of a face, eyebrows, an eye, a nose, opening, etc.) which are the switches which specify the description of a face and constitute a face. Six pieces are prepared as each parts which constitute a face from this example. About the face image displayed on the display 11, the cursor switch 3 chooses alternatively each parts (for example, hair, eyebrows, an eye, a nose, opening, etc.) which constitute a face. Specifically, parts are chosen by moving the cursor location

on a screen (for example, expressed with a flashing condition). In addition, a mouse etc. may be used other than the cursor switch 3. Use of a mouse is the same about other switches.
[0013] The display switch 4 is operated, when display a face image on a display 11 and correcting it, or the created face image is in a desired condition and it sets as a completion screen. The age input key 5 inputs and specifies the data about age, and has age actual as data about age, and a birth date. A ten key is used so that the age input key 5 can input age or a birth date easily. The age input key 5 constitutes an assignment means to specify the data about age.
[0014] The program ROM 6 stores the control program of CPU1, and the contents are shown in each below-mentioned drawing. A work piece RAM 7 is used as a work area in the control which CPU1 performs. The parts screen ROM 8 has memorized the parts pattern showing a face image for every parts, and constitutes a parts pattern storage means. Here, an example of the parts pattern for every parts memorized on the parts screen ROM 8 is shown like drawing 2. In drawing 2, there are various kinds of things which constitute a face as a parts class (N) of face. In this case, as a parts class (N) of face, a hairstyle and (N) =2 are prepared for the profile of a face and two or more sorts of (N) =3 are prepared for (N) =1 for an eye and (N) =4 to call it a supercilium. In addition, a thing called a nose and opening is prepared not only for the example which showed the parts class (N) to drawing 2 but for others. Moreover, other parts classes (N) may be prepared.
[0015] if a parts pattern is the deformation mode (it has the description according to age especially) of each parts, and it is the example of drawing 2, for example, its attention is paid to the hairstyle of the male of (N) =1 on the other hand — as parts pattern NO. of this hairstyle — [01], [02], and [03] ..... as — corresponding to various kinds of types, two or more sorts of things are prepared beforehand, and are memorized on the parts screen ROM 8. It is arranged so that age may go up, as parts pattern NO. becomes large. Similarly, each parts pattern is beforehand prepared also about the profile of a face, the eye, and the supercilium. Moreover, about each parts pattern, there is a thing as the variation beforehand prepared further, and memorized, for example, shown in drawing 3 as a variation of the profile pattern of parts pattern NO. [03]. In drawing 3, there are 16 kinds of each profile patterns from [A-11] to [A-44], and these have various kinds of variations according to the actual condition that the profile of various faces exists.
[0016] When VRAM9 creates a face image, the creation image is memorized per 1 screen, and semiconductor memory is used as VRAM9, for example. A table ROM 10 memorizes the face description data according to age, and constitutes the face description data storage means. As face description data according to age, there is whenever [aspect ratio / of a face /, height / of an eye /, magnitude / of an eye /, number / of a wrinkling / and retreat / in the hair case] etc. When the face description data memorized by the table ROM 10 are explained concretely, there is a thing as shown, for example in drawing 4. ..., such as a wrinkling of an outer canthus, a wrinkling of a frame, and a wrinkling of a cheek, has been arranged as parts which express the description of a face with drawing 4 to an axis of ordinate, 5 years old of age were divided into the axis of abscissa one by one from each 30 years old, and the description to 100 years old is arranged. And when its attention is paid to the wrinkling of an outer canthus, for example, there is no wrinkling of an outer canthus at the age of 30, but the description (in this case, wrinkling of an outer canthus) of a face according to age is beforehand memorized so that the wrinkling of an outer canthus may increase, as age goes up. In addition, not only an example as shown in drawing 4 but other examples are sufficient as the description of a face according to age.
[0017] A display (display means) 11 is in the middle of creation, displays the face image when choosing each parts, or displays the completed face image, displaying the image by which creation processing is carried out, and delivering and receiving data between VRAMs9 by CPU1. The display 11 has TV display 7 in order to display an image. In addition, the part which displays an image does not have not only a TV display but the monitoring device of dedication or CRT, and may display an image with liquid crystal, such as LCD. Or what is used also [applications / other] may be used.
[0018] Next, an operation is explained. Drawing 5 is a flow chart which shows the main program of face image creation processing. A start of this program performs initial setting at step S10 first. In initial setting, clearance of various registers and work pieces RAM7 and VRAM9, initialization of a subroutine, reset of a flag, etc. are performed. Subsequently, a pointer M1 is cleared to [0] at step S12. A pointer M1 is used as an object for the assignment when inputting information, such as the description of a face, and age, and the value is stored in the register with which it corresponds in CPU1.
[0019] Subsequently, the contents of VRAM9 are displayed on a display 11 at step S14. Thereby, it is for example, in the middle of creation, and the face image and the completed face image when choosing each parts are displayed on a display 11. And henceforth, it stands by to this step S14, and required processing is performed based on the interruput signal from each switch at this time. That is, all processings when choosing each parts etc. are performed by the interruption routine shown below.
[0020] Drawing 6 is a flow chart which shows the description switch interruption routine. If the description switch 2 is operated, it will shift to this description switch interruption routine. If it shifts to this interruption routine, only [1] will increment a pointer M1 at step S20 first. Subsequently, it distinguishes whether a pointer M1 is equal to [9] at step S22. Here, since there are eight pieces as face description data showing the description of a face, a pointer M1 is compared with [9] for judging whether it was set to [9] which is a value exceeding eight pieces.
[0021] If a pointer M1 is not equal to [9], it progresses to step S26 and the contents of screen data are transmitted to VRAM9 by making the data of the address in a work piece RAM 7 (M1+OFFSET1) into a start address. For example, at the time of M1=1 (1+OFFSET1), the data of an address serve as a start address, and the contents of the screen data of a work piece RAM 7 are transmitted to VRAM9.

[0022] Here, as shown in a work piece RAM 7 at drawing 7, various kinds of required data are mainly (OFFSET 5+2) temporarily stored in before an address from an address (OFFSET 1+1). For example, the data as which the area which makes an address (OFFSET 1+1) the address is specified by the pointer M= 1 and which become ADD1 are stored, and this data corresponds to the address for every parts memorized on the parts screen ROM 8. The data as which the area which makes an address (OFFSET 1+7) the address is specified by the pointer M= 7 and which become ADD7 are hereafter stored by similarly storing the data as which the area which makes an address (OFFSET 1+2) the address is specified by the pointer M= 2 and which become ADD2. Even the data which are finally specified by the pointer M= 8 at least and which become ADD8 are stored.
[0023] if other area of a work piece RAM 7 is explained — an address (OFFSET 2+1) and an address (OFFSET 2+2) — the data corresponding to a cursor location in .... are stored. (OFFSET 3+1) an address and an address (OFFSET 3+2) .... is y register and the data about age are stored. (OFFSET 4+1) an address and an address (OFFSET 4+2) — the data with which .... expresses the description of a face are stored. Data concerning [the area which makes an address (OFFSET 4+1) the address] a hairstyle are stored, and, specifically, the sex parameter which distinguishes a male or a woman is stored in the most significant bit (part shown by a) of data. A sex parameter is 1 bitwise, expresses a male at the time of [1], and expresses a woman at the time of [0].
[0024] Moreover, among the area which makes an address (OFFSET 4+1) the address, the data about a hairstyle are stored in the bit field b by the side of a high order (high-order-bit group), and the description data according to age are stored in it about a hairstyle in the bit field c by the side of low order (lower bit group) among these area.
[0025] (OFFSET 4+2) Data concerning [the area which makes an address the address] the profile of a face are stored, and a sex parameter is stored in most significant bit [of data] a. (OFFSET 4+2) Among the area which makes an address the address, the data about the profile of a face are stored in the high-order-bit group b, and the description data according to age are stored in it about the profile of a face at the lower bit group c among these area. (OFFSET 4+3) Data concerning [the area which makes an address the address] an eye are stored, and a sex parameter is stored in most significant bit [of data] a. (OFFSET 4+3) Among the area which makes an address the address, the data about an eye are stored in the high-order-bit group b, and the description data according to age are stored in it about an eye at the lower bit group c among these area.
[0026] Hereafter, data (for example, a nose, opening, etc.) are stored in condition that data concerning [the area which makes an address (OFFSET 4+4) the address similarly] a supercilium are stored, one by one. In addition, according to age, the mode which three kinds, the hairstyle and profile which were mentioned above, and an eye, have a remarkable change, therefore changed as description data according to age according to age about these three kinds (a hairstyle, a profile, eye) is stored as description data among the description parts of a face. (OFFSET 5+1) an address and an address (OFFSET 5+2) — the data with which .... expresses the wrinkling of a face are stored. The data which carry out Seki to the wrinkling of an outer canthus are stored in the area which specifically makes an address (OFFSET 5+1) the address, the data which carry out Seki to the wrinkling of a frame are stored in the area which makes an address (OFFSET 5+2) the address, and the data which carry out Seki to the wrinkling of a cheek are stored in the area which makes an address (OFFSET 5+3) the address.
[0027] Now, it is although the data of an address serve as a start address at the time of pointer M1=1 (1+OFFSET1) and the contents of the screen data of a work piece RAM 7 are transmitted to VRAM9, as mentioned above, for example, At this time, the data of the address in a work piece RAM 7 (1+OFFSET1) are ADD1, and those contents are one of the screens for every parts memorized on the parts screen ROM 8 as shown in drawing 8. In drawing 8, the screen data corresponding to the address of ADD1 are a screen which chooses sex, therefore at the time of M1=1, a screen as shown in drawing 9 (a) corresponding to ADD1 appears, and the screen to which one of assignment of [01]:males or [02]:woman is urged appears.
[0028] Similarly, in drawing 8, the screen data corresponding to the address of ADD2 are a screen which chooses a hairstyle, for example, the amount of hair is rich and divides 73, and the amount of [02] of hair is thin, and [01] is divided 73, and has become like ..... The screen to which selection of a hairstyle is urged as shown in drawing 9 (b) corresponding to this ADD2 and which carries out a screen appears. The screen data corresponding to the address of ADD3 are a screen which chooses the profile of a face, for example, have become like [01], [02], and ..... Although illustration is omitted corresponding to this ADD3, the screen to which selection of the profile of a face is urged and which carries out a screen appears. the screen where the screen data corresponding to the address of ADD4 choose an eye — it is — [01] — an eye — a round shape — an eyelid with a fold and [02] — an eye — an egg shape and [03] — an eye — a fox — an egg ..... as — it has become. [for example,] The screen to which selection of the form of an eye is urged as shown in drawing 9 (c) corresponding to this ADD4 and which carries out a screen appears.
[0029] The screen data corresponding to the address of ADD5 are a screen which chooses a supercilium, for example, as for [01], a form becomes [a supercilium] for three months, and, as for [02], ****** has become [the supercilium] like a ** type and ..... The screen to which selection of the form of a supercilium is urged as shown in drawing 9 (d) corresponding to this ADD5 and which carries out a screen appears. The screen data corresponding to the address of ADD6 are a screen which chooses a nose, for example, have become like [01], [02], and ..... Although illustration is omitted corresponding to this ADD6, the screen to which selection of a nose is urged and which carries out a screen appears. The screen data corresponding to the address of ADD7 are a screen which chooses opening, for example, have become like [01], [02], and ..... Although illustration is omitted corresponding to this ADD7, the screen to which selection of opening is urged and which carries out a screen appears. Moreover, although the screen data corresponding to the address of ADD8 are a screen which demands the input of age and illustration is omitted corresponding to this ADD8, the screen to which the input of the age from the age input key 5 is urged

and which carries out a screen appears.
[0030] A return will be carried out if it passes through processing of return and step S26 to explanation of drawing 6 again. And the same processing will be repeated if it becomes the following description switch interruption routine. If a pointer M1 is first incremented at step S20 and a pointer M1 becomes equal to [9] at step S22 at this time, it progresses to step S24, and a pointer M1 will be returned to [1] and it will progress to step S26 after that. Thus, if the pointer M1 is incremented [1] every whenever the description switch 2 is operated, and Pointer M becomes equal to [9], returning a pointer M1 to [1] again will be performed. Therefore, the contents of screen data are transmitted to VRAM9 by making the data of the address (M1+OFFSET1) of the work piece RAM 7 corresponding to pointer M1=1 into a start address, and whenever the description switch 2 is operated, [1] every increment of the pointer M1 is carried out, and henceforth, the contents of the screen data of an address (M1+OFFSET1) are transmitted to VRAM9, and are displayed on a display 11.
[0031] Whenever the description switch 2 is operated, the contents of every screen data change, as shown in drawing 9. That is, if the description switch 2 is operated, it will shift to the description switch interruption routine, and the screen shown in drawing 9 will appear each time. The operator will choose the description of a face about sex, a hairstyle, an eye, a supercilium, ..., etc., looking at the screen shown in this drawing 9.
[0032] Drawing 10 is a flow chart which shows an age switch interruption routine. If the age input key 5 is operated, it will shift to this age switch interruption routine. If it shifts to this interruption routine, the age data first inputted into y register by actuation of the age input key 5 at step S50 are stored. For example, if age is inputted as 30 years old, the age data [30] are stored in y register. Subsequently, the contents (namely, age data) of the y register are written in the address (OFFSET3) of a work piece RAM 7 at step S52. Subsequently, Pointer M is set to [1] at step S54. Since a hairstyle corresponds in a pointer M= 1 and a profile and M= 3 correspond like an eye and .... in M= 2, Pointer M is set to [1] at step S54 for choosing description data called a hairstyle as the beginning, and subsequently choosing the description data (for example, parts pattern) according to age as the condition of a profile one by one.
[0033] Subsequently, it progresses to step S56 and distinguishes whether Pointer M is the range of [1] - [3]. When Pointer M is in the range of [1] - [3], it judges whether it is the routine which chooses a hairstyle, a profile, and the description data of an eye as description data of a face. Description data called these hairstyles, a profile, and an eye are because the need of making it changing corresponding to age is large. When it is the routine which it is in the range of [1] - [3] at the time M of YES, i.e., a pointer, at step S56, and chooses a hairstyle, a profile, and which description data of an eye, it progresses to step S58 and the contents of the y register are changed on the Mth table. For example, when Pointer M is the routine which chooses the description data of a hairstyle by [1], the contents of the y register are changed on the 1st table. Since the description data (for example, parts pattern) of a hairstyle according to age are contained in the 1st table, it is changed into the parts pattern of a hairstyle according to the age (the contents of the y register) when it was inputted at this time.
[0034] Subsequently, the data (parts pattern) changed at step S60 are stored in the lower bit group c of the area which makes an address (OFFSET4+M) the address. For example, when Pointer M is the routine which chooses the description data of a hairstyle by [1], the parts pattern of a hairstyle according to age is stored in the lower bit group c. Thereby, it becomes possible to display the description corresponding to age about a hairstyle. Similarly, when Pointer M is the routine which chooses the description data of the profile of a face by [2], the parts pattern of a profile according to age is stored in the lower bit group c. Moreover, when Pointer M is the routine which chooses the description data of an eye by [3], the parts pattern of an eye according to age is stored in the lower bit group c.

[0035] Subsequently, it distinguishes whether Pointer M was incremented at step S61, and Pointer M was set to [7] at step S62. This judges whether selection of a hairstyle, a profile, an eye, and all six description data of .... was completed as description data of a face. If it is not M= [7], it will return to step S56 and the same loop formation will be repeated. And if Pointer M is in the range of [4] - [6] at step S56 when there is no pointer M in the range of [1] - [3] namely, it will branch to step S64. It becomes the processing to the description data of a face without the need of making it changing like a comparison of those other than a hairstyle, a profile, and an eye corresponding to age at this time. Therefore, at step S64, a predetermined value is stored in the lower bit group c of the area which makes an address the address (OFFSET4+M). A predetermined value is stored because description data other than a hairstyle, a profile, and an eye are fixed to a fixed condition. For example, when Pointer M is the routine which chooses the description data of a supercilium by [4], the parts pattern of the supercilium of a fixed configuration is stored in the lower bit group c irrespective of age. Subsequently, Pointer M is incremented at step S61, and step S62 is distinguished. Thus, this routine will be ended, if the above-mentioned loop formation is repeated and it becomes M= [7] until it becomes M= [7].
[0036] Drawing 11 is a flow chart which shows a cursor switch interruption routine. If the cursor switch 3 is operated, it will shift to this cursor switch interruption routine. If it shifts to this interruption routine, it will distinguish whether image data is under display at step S80 first (for example, it judges with a display flag). This is because cursor has not appeared if it does not judge whether a certain screen is displayed on the display 11 and the screen is not displayed. Therefore, if image data is not [be / it] under display, the return of this routine will be carried out.
[0037] On the other hand, when image data is under display, it progresses to continuing step S82, and the data of the address (M+OFFSET2) of a work piece RAM 7 are changed according to a cursor location. (OFFSET2) Since an address stores the data corresponding to a cursor location, the data of an address (OFFSET 2+1) are changed according to a cursor location about a hairstyle at the time of M= 1, for example. Moreover, the data of an address

(OFFSET 2+2) are changed according to a cursor location about a profile at the time of M= 2. For example, in order to choose a parts pattern, when the cursor switch 3 is operated, one of the variations of various kinds of parts patterns about a profile as shown in drawing 2 is chosen by the car sol.
[0038] Subsequently, the display of a cursor location is changed at step S84. Thereby, when the cursor switch 3 is operated and moved, the display position is changed and it is shown in a screen. Subsequently, it distinguishes whether Pointer M is [1] at step S86. That is, it distinguishes whether it is the screen which judges sex. It distinguishes whether it progresses to step S88 and the data of an address (OFFSET2+M) express a man at the time of M= [1]. When it is a thing showing a man, it returns to N= 1 at step S90 first. N is a sex pointer. This is for carrying out sequential increment of the sex pointer N from the area corresponding to the minimum value, i.e., (OFFSET 2+1), an address. (OFFSET4+M) The sex parameter with which the data with which an address expresses the description of a face are stored, and distinguish a male or a woman to most significant bit MSB (part shown by a) of the data is stored. A sex parameter is 1 bitwise, expresses a male at the time of "1", and expresses a woman at the time of "0."
[0039] Subsequently, it progresses to step S92 and MSB of the data of an address (OFFSET4+N) is set to "1." Since it is N= 1 at this time, MSB of the data of an address will be set to "1" first (OFFSET 4+1). Subsequently, the sex pointer N is incremented at step S94. This is set to N= 2. Subsequently, it distinguishes whether it was set to N= 7 at step S96. N= 7 is judged for setting the MSB to "1" to the maximum address of an address (OFFSET4+N). Since it is not N= 7, it returns to step S92 and the same processing is repeated this time. Therefore, since it is N= 2 shortly, MSB of the data of an address (OFFSET 4+2) is set to "1." the following — the same — carrying out — an address (OFFSET 4+3) and ... (OFFSET 4+6) — MSB of each data of an address is set to "1", respectively.
[0040] And if set to N= 7 at step S96, this cursor switch interruption routine will be ended and a return will be carried out to a main program. the time of on the other hand Pointer M not being [1] at step S86 — step S106 — jumping — the contents of the address (OFFSET2+M) — {(OFFSET4+(M-1)} it transmits to the high-order-bit group b except MSB of the data of an address.) By this, the contents of data of the location specified by the cursor switch 3 will be transmitted to the area which stores the description data of a face. If it passes through step S106, a cursor switch interruption routine will be ended and a return will be carried out to a main program. Moreover, when it is what the data of the time of NO, i.e., (OFFSET2+M), an address, do not express a man with step S88, and expresses a woman, it progresses to step S98 and the sex pointer N is returned to N= 1. This is for carrying out sequential increment of the sex pointer N from the area corresponding to the minimum value, i.e., (OFFSET 2+1), an address.
[0041] Subsequently, MSB of the data of an address (OFFSET4+N) is set to "0" at step S100. Since it is N= 1 at this time, MSB of the data of an address will be set to "0" first (OFFSET 4+1). Subsequently, the sex pointer N is incremented at step S102. This is set to N= 2. Subsequently, it distinguishes whether it was set to N= 7 at step S104. N= 7 is judged for setting the MSB to "0" to the maximum address of an address (OFFSET4+N). Since it is not N= 7, it returns to step S100 and the same processing is repeated this time. Therefore, since it is N= 2 shortly, MSB of the data of an address (OFFSET 4+2) is set to "0." the following — the same — carrying out — an address (OFFSET 4+3) and ... (OFFSET 4+6) — MSB of each data of an address is set to "0", respectively. And if set to N= 7 at step S104, this cursor switch interruption routine will be ended and a return will be carried out to a main program.
[0042] Drawing 12 is a flow chart which shows a display switch interruption routine. If the display switch 4 is operated, it will shift to this display switch interruption routine. If it shifts to this interruption routine, a display flag will be first reversed at step S150. Therefore, a display flag is reversed whenever the display switch 4 is operated. For example, at first, if a display flag is "0" and it is operated, a display flag will be set to "1" and "0" and "1" will be henceforth repeated for every actuation. Thus, it judges whether the display switch 4 was operated to the last routine.
[0043] Subsequently, it distinguishes whether a display flag is "1" at step S152. "1" is the case of the first routine in a display flag. The screen data which branched to step S154 at this time, set to M1=1, and made the start address the contents stored further (OFFSET 1+1) in the address are transmitted to VRAM9. At this time, the data of the address in a work piece RAM 7 (OFFSET 1+1) are ADD1, and the screen data corresponding to the address of ADD1 are a screen which chooses sex. Therefore, a screen as shown in drawing 9 (a) at first corresponding to ADD1 is displayed on a display 11. According to this screen, an operator operates the cursor switch 3 and specifies either [01]:males or [02]:woman. If it passes through step S154, a return will be carried out to a main program.
[0044] On the other hand, since a display flag is reversed whenever the display switch 4 is operated after ending the first routine, the distinction result of step S152 is set to YES, and progresses to step S156 next time. At step S156, Pointer M is returned to [1]. Since a hairstyle corresponds in a pointer M= 1 and a profile and M= 3 correspond like an eye and .... in M= 2, returning Pointer M to [1] at step S156 chooses the description data of a hairstyle first, and, subsequently it is for making sequential selection and displaying the description data (for example, parts pattern) according to age from a profile.
[0045] Subsequently, it distinguishes whether Pointer M is [3] at step S158. M= [3] specifies the description data of an eye. Since only an eye has the description of going up according to age and this is inconvenient by having displayed as it is, it is for changing the location. Therefore, if it is not M= [3], it will judge that it is not the routine which specifies the description data of an eye, and will progress to step S160, and the screen data which made the start address the contents stored in the address (OFFSET4+M) will be transmitted to VRAM9. At this time, the data of the address in a work piece RAM 7 (OFFSET4+M) are area which stores the description data for a face. The face image according to description data other than an eye is displayed on a display 11.

[0046] Subsequently, Pointer M is incremented at step S162, and it distinguishes whether Pointer M is [7] at step S164. This judges whether selection of a hairstyle, a profile, and all six description data of an eye was completed as description data of a face. If it is not M= [7], it will return to step S158 and the same loop formation will be repeated. If it becomes M= [3] at step S158 at this time, processing which branches to step S166 and displays the description data of an eye will be performed. That is, at step S166, the contents of 3rd OFFSET are transmitted to y register. That is, age data are transmitted.
[0047] Subsequently, the y-coordinate of the screen data which read the screen data which made the start address the contents stored in the address (OFFSET4+M) at step S168 one by one, and were read at step S170 is changed based on the contents of the y register, and it transmits to VRAM9. Thereby, about an eye, the location (especially y-coordinate location) changes according to age, and a suitable face image is displayed on age by the display 11. Generally, if age goes up, since it is in an inclination which the location of an eye goes up, along with it, the location of an eye will become the face image corrected according to age. If it passes through step S170, it will progress to step S162.
[0048] Thus, if the above-mentioned processing is repeated in the range of [1] - [6] and Pointer M becomes M= [7] at step S164, it will progress to step S172. At step S172, it distinguishes whether the value of y register is smaller than [30]. This judges whether assignment of age is less than 30 years old. If age is less than 30 years old, since possibility that a wrinkling is in a face is low, this routine is ended and a return is carried out to a main program. On the other hand, at step S172, the value of y register is more than [30], and when assignment of age is 30 or more years old, it progresses to step S174. At step S174, the y-coordinate of the screen data which read the screen data which made the start address the contents (namely, wrinkling of an outer canthus) stored in 5th OFFSET one by one, and were read at step S176 is changed based on the contents of the y register, and it transmits to VRAM9. Thereby, about the wrinkling of an outer canthus, a number and its location (especially y-coordinate location) change according to the age of 30 or more years old less than 40 years old, and the face image which has the wrinkling of a suitable outer canthus of age is displayed on a display 11. if age goes up and the number of the wrinkling of an outer canthus will generally increase -- being also alike -- since it is in the inclination for the location of the wrinkling of an outer canthus to change, it becomes the face image by which the number and location of a wrinkling of an outer canthus were corrected along with it.
[0049] Subsequently, it progresses to step S178 and distinguishes whether the value of y register is smaller than [40]. This judges whether assignment of age is less than 40 years old at the age of 30 or more. If age is less than 40 years old, possibility that a wrinkling is in a frame is higher than 30 years old, but since there are few wrinklings compared with 50 years old, wrinkling processing of a frame is performed in 30 years old - 40 years old this time. This routine is ended at step S178 at the time of YES, i.e., when assignment of age is 40 or more years old, and a return is carried out to a main program. On the other hand, when assignment of age is less than 40 years old at the age of 30 or more, the screen data which made the start address the contents (namely, wrinkling of a frame) which progressed to step S180 and were stored in the address (OFFSET 5+1) are transmitted to VRAM9. Thereby, about the wrinkling of a frame, the number changes according to the age of 30 or more years old less than 40 years old, and the face image which has the wrinkling of a suitable frame of age is displayed on a display 11. Generally, if age goes up, since it is in the inclination for the number of the wrinkling of a frame to increase, it will become the face image by which the number of the wrinklings of a frame was corrected along with it.
[0050] Subsequently, it progresses to step S182 and distinguishes whether the value of y register is smaller than [50]. This judges whether assignment of age is less than 50 years old at the age of 40 or more. If age is less than 50 years old, possibility that a wrinkling is in the cheek of a face is higher than 40 years old, but since there are few wrinklings compared with 60 years old, wrinkling processing of a cheek is performed in 40 years old - 50 years old this time. This routine is ended at step S182 at the time of YES, i.e., when assignment of age is 50 or more years old, and a return is carried out to a main program. On the other hand, when assignment of age is less than 50 years old at the age of 40 or more, the screen data which made the start address the contents (namely, wrinkling of a cheek) which progressed to step S184 and were stored in the address (OFFSET 5+2) are transmitted to VRAM9. Thereby, about the wrinkling of a cheek, the number changes according to the age of 40 or more years old less than 50 years old, and the face image which has the wrinkling of a suitable cheek of age is displayed on a display 11. Generally, if age goes up, since it is in the inclination for the number of the wrinkling of a cheek to increase, it will become the face image by which the number of the wrinklings of a cheek was corrected along with it. If it passes through step S182, this routine will be ended and a return will be carried out to a main program.
[0051] Thus, at this example, if a power source is switched on to this equipment, while an early face image is displayed on a display 11, carries out based on the image and corrects to it at first, the face image of 30 years old of arbitration (basic face image) will be created and displayed in the combination of each parts pattern by manual selection. An example of the face image of 30 years old is shown like drawing 13 (a), and is using the male face image as the model here. Then, if the age input key 5 is operated, for example, the age of 10 years old is inputted, among each parts of the face image (basic face image) of 30 years old, the parts pattern of an eye moves to the location of the bottom which responded to 10 years old, it will carry out [that a hairstyle is changed into the hairstyle according to 10 years old, etc. and], and a suitable face image will be automatically created by the face of 10 years old as shown in drawing 13 (d).
[0052] Moreover, when the age input key 5 is operated, for example, the age of 40 years old is inputted, it is, The parts pattern of an eye moves to the upper location a little among each parts of the face image (basic face image) of 30 years old. The wrinkling of an outer canthus is added (the location of an outer canthus is also moved a little), a hairstyle is changed into the hairstyle according to 40 years old, it carries out [that the wrinkling of the

circumference of opening is added further, etc. and], and a suitable face image is automatically created by the face of 40 years old as shown in drawing 13 (b).
[0053] As the example which age went up with great force on the other hand If the age input key 5 is operated, for example, the age of 65 years old is inputted The parts pattern of an eye moves to the upper location further among each parts of the face image (basic face image) of 30 years old. The wrinkling of an outer canthus is added further (the location of an outer canthus is also moved), and a hairstyle is changed into the hairstyle according to 65 years old, and it carries out [that the wrinkling of the circumference of opening is added further, etc. and], and a suitable face image is automatically created by the face of 65 years old as shown in drawing 13 (c).
[0054] Therefore, a suitable face image can be created quickly and easily of age, without needing special skill. Moreover, an inconsistency with the age grasped as the age subjectively grasped from the created face image objective can be evaluated objective. in addition, by carrying out the partition by sex, even if it boils and attaches a female face, the face image according to age can be automatically created by the same processing. Moreover, even if a face image may be its face or is others' face, it can completely create the face image according to age automatically similarly. Furthermore, the face image according to age is displayed by the display 11, and also printing section 11A is prepared, and you may make it print in a label tape, a regular paper, etc. by this printing section 11A.
[0055]
[Effect of the Invention] If the data about age are specified with an assignment means according to invention according to claim 1, A suitable face image can be created quickly and easily of the specified age, without needing special skill, since the face image (for example, its face or others' face) is creating automatically by reading the face description data according to the data concerned from the face description data storage means, and reading and combining each parts image which corresponds from a parts image storage means according to the face description data.
[0056] According to invention according to claim 2, it is a face image (for example, its face or others' face) beforehand, If the age of the face is registered as a basic face image and other different age from the age is specified Age difference data are outputted from the data about the age memorized for the age data storage means. It is based on the face description data memorized for this age difference data and the face description data storage means. The face description data memorized for the face description data storage means are changed, and a basic face image is corrected based on this changed face description data. A new face image suitable of that age The face.of the past when the precision relevant to a basic face is high, or the anticipation face of the future can be created simply and quickly, without needing special skill, since he is trying to create automatically for example, (the past face or the anticipation face of the future). Moreover, if the data about the age of a face image to create are specified according to invention according to claim 3, each parts image corresponding to the data about this specified age can be read from a parts image storage means, and a face image can be created quickly and easily with a face image creation means combining each of this read parts image. moreover — if according to invention according to claim 4 the data about age are specified after displaying the 1st face image which consists of combination of two or more parts images Based on the data about this specified age, at least one parts image in the 1st face image already displayed can be replaced, the 2nd face image corresponding to the data about said specified age can be created, and this 2nd created face image can be displayed. Moreover, according to invention according to claim 5, after displaying the 1st face image, the 1st face image already displayed to specify the data about age can be changed into the 2nd face image corresponding to the data about said specified age, and this 2nd changed face image can be displayed.
[Brief Description of the Drawings]
[Drawing 1] It is the block diagram of one example of the face image listing device concerning this invention.
[Drawing 2] It is drawing showing an example of the parts pattern for every parts memorized on the parts screen ROM of this example.
[Drawing 3] It is drawing showing an example of the variation of the profile pattern of this example.
[Drawing 4] It is drawing showing an example of the face description data according to the age of this example.
[Drawing 5] It is the flow chart which shows the main program of face image creation processing of this example.
[Drawing 6] It is the flow chart which shows the description switch interruption routine of this example.
[Drawing 7] It is drawing showing an example of the data storage area of the work piece RAM of this example.
[Drawing 8] It is drawing showing an example of the screen data for every parts memorized on the parts screen ROM of this example.
[Drawing 9] It is drawing showing an example of the display screen of this example.
[Drawing 10] It is the flow chart which shows the age switch interruption routine of this example.
[Drawing 11] It is the flow chart which shows the cursor switch interruption routine of this example.
[Drawing 12] It is the flow chart which shows the display switch interruption routine of this example.
[Drawing 13] It is drawing showing an example of the creation face image of this example.
[Description of Notations]
1 CPU (Face Image Creation Means, Age Difference Output Means, the Face Description Data Origination Means)
2 The Description Switch
3 Cursor Switch
4 Display Switch
5 Age Input Key (Assignment Means)
6 Program ROM
7 Work Piece RAM

8 Parts Screen ROM (Parts Image Storage Means, Face Image Data Storage Means, Age Data Storage Means, the Face Description Data Storage Means)
9 VRAM
10 Table ROM (the Face Description Data Storage Means)
11 Display (Display Means)
11A Printing section (printing means)

[Translation done.]

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(71)出願人　000001443
カシオ計算機株式会社
東京都新宿区西新宿２丁目６番１号

(72)発明者　村田　嘉行
東京都羽村市栄町３丁目２番１号　カシオ計算機株式会社羽村技術センター内

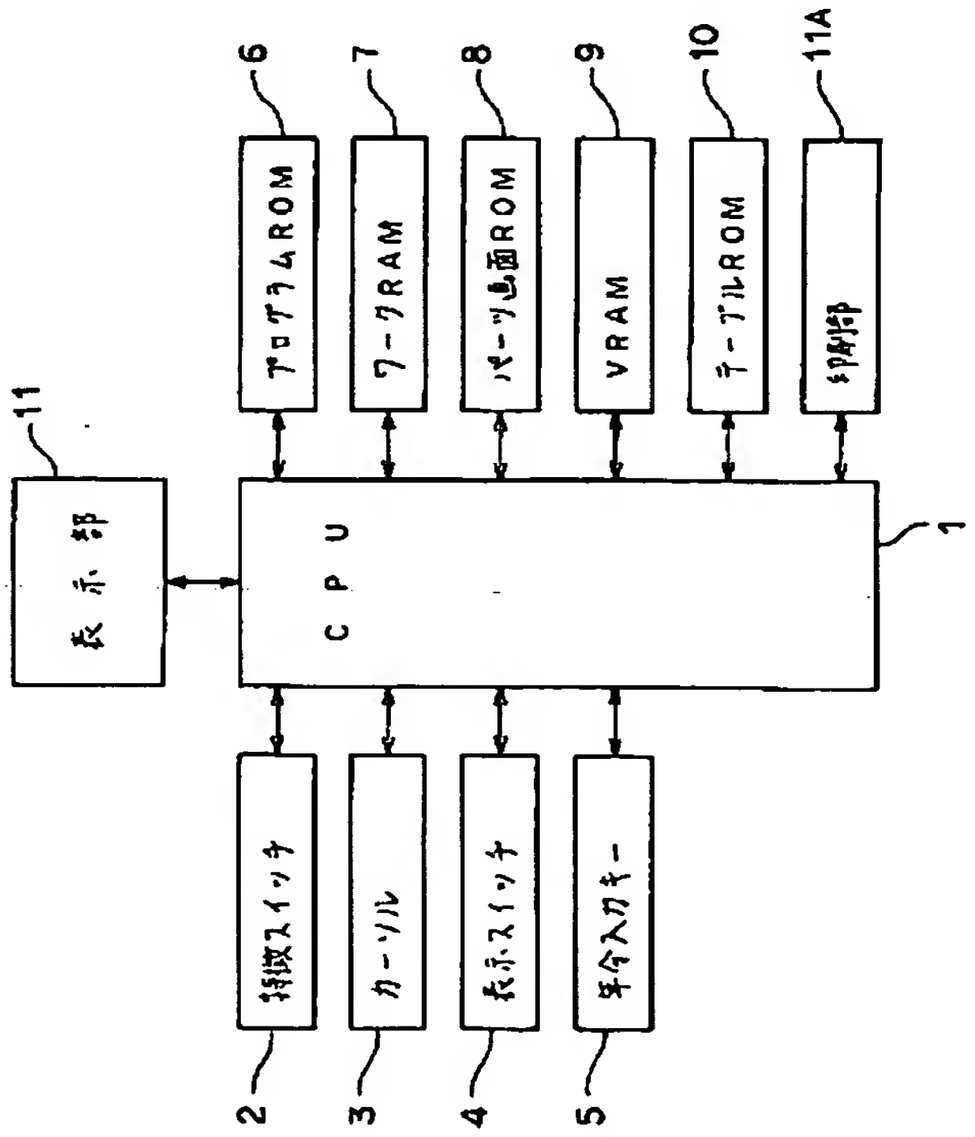
(72)発明者　山口　善登
東京都羽村市栄町３丁目２番１号　カシオ計算機株式会社羽村技術センター内

(54)【発明の名称】　顔画像作成装置

(57)【要約】

【目的】　年齢に相応しい顔画像を迅速かつ容易に作成し、しかも顔画像から主観的に把握される年齢と客観的に把握される年齢との食い違いを客観的に評価できるようにする。

【構成】　年齢入力キー５により年齢に関するデータを指定すると、ＣＰＵ１がプログラムＲＯＭ６の内蔵プログラムに従って当該年齢指定データに応じた顔特徴データをパーツ画面ＲＯＭ８から読み出し、その顔特徴データに応じてパーツ画面ＲＯＭ８から対応する各パーツ毎のパーツパターンを読み出して組み合せることにより、顔画像（例えば、自分の顔あるいは他人の顔）を自動的に作成する処理を行い、表示部１１に表示させる。これにより、年齢に相応しい顔画像を迅速かつ容易に作成する。



【特許請求の範囲】

【請求項１】　顔画像を表す各パーツ毎のパーツパターンを記憶するパーツパターン記憶手段と、
年齢に応じた顔特徴データを記憶する顔特徴データ記憶手段と、
年齢に関するデータを指定する指定手段と、
この指定手段により年齢に関するデータが指定されると、当該データに応じた顔特徴データを前記顔特徴データ記憶手段から読み出し、その顔特徴データに応じて前記パーツパターン記憶手段から対応する各パーツ毎のパーツパターンを読み出し組み合せて顔画像を作成する顔画像作成手段と、を備えたことを特徴とする顔画像作成装置。

【請求項２】　前記顔特徴データ記憶手段は、年齢に応じた顔特徴データとして顔の縦横比、目の高さ、目の大きさ、しわの本数、髪際の後退度を記憶していることを特徴とする請求項１記載の顔画像作成装置。

【請求項３】　前記指定手段は、年齢に関するデータとして実際の年齢、生年月日のうち少なくとも１つを指定することを特徴とする請求項１記載の図形表示装置。

【請求項４】　前記顔画像作成手段によって作成された顔画像を表示、又は印刷する手段を、さらに有することを特徴とする請求項１記載の顔画像作成装置。

【請求項５】　各パーツ毎のパーツパターンを組み合せて構成された顔画像データを記憶する顔画像データ記憶手段と、
この顔画像データ記憶手段に記憶されている顔画像データに対応した年齢に関するデータを記憶する年齢データ記憶手段と、
年齢に応じた顔特徴データを記憶する顔特徴データ記憶手段と、
年齢に関するデータを指定する指定手段と、
この指定手段により年齢に関するデータが指定されると、その指定データと、前記年齢データ記憶手段に記憶されている年齢に関するデータとに基づいて年齢差データを出力する年齢差出力手段と、
前記顔画像データ記憶手段から顔画像データを読み出して基本となる顔画像を作成するとともに、前記年齢差出力手段から出力された年齢差データと、前記顔特徴データ記憶手段に記憶されている顔特徴データとに基づいて、前記顔特徴データ記憶手段に記憶されている顔特徴データを変更し、この変更した顔特徴データに基づいて前記基本となる顔画像を修正して新たな顔画像を作成する顔特徴データ作成手段と、を備えたことを特徴とする顔画像作成装置。

【請求項６】　前記顔画像データ記憶手段は、自分の顔あるいは他人の顔についての顔画像データを記憶することを特徴とする請求項５記載の顔画像作成装置。

【請求項７】　前記年齢データ記憶手段は、年齢に関するデータとして実際の年齢、生年月日、何年先、何年後のうち少なくとも１つを記憶することを特徴とする請求項５記載の顔画像作成装置。

【請求項８】　前記顔特徴データ記憶手段は、年齢に応じた顔特徴データとして顔の縦横比、目の高さ、目の大きさ、しわの本数、髪際の後退度を記憶していることを特徴とする請求項５記載の顔画像作成装置。

【請求項９】　前記指定手段は、年齢に関するデータとして実際の年齢、生年月日、何年先、何年後のうち少なくとも１つを指定することを特徴とする請求項５記載の顔画像作成装置。

【請求項１０】　前記顔特徴データ作成手段は、前記顔特徴データ記憶手段に記憶されている顔特徴データの変更処理として、顔の縦横比に応じた輪郭のパーツの変更、目の位置の変更、髪型の変更、しわの追加を行い、この変更した顔特徴データに基づいて過去の顔あるいは未来の予想顔を作成することを特徴とする請求項５記載の顔画像作成装置。

【請求項１１】　前記顔特徴データ作成手段によって作成された新たな顔画像を表示、又は印刷する手段を、さらに有することを特徴とする請求項５記載の顔画像作成装置。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、顔画像作成装置に係わり、詳しくは年齢を指定すると、その年齢に相応しい顔画像が自動的に作成される顔画像作成装置に関する。

【０００２】

【従来の技術】従来、顔画像を作成するには、例えばマイクロコンピュータを用いた図形表示装置を使用しており、この装置では、顔を構成する各パーツ（例えば、目、眉、口等）毎にパーツパターンを組み合せることで、顔画像を作成している。

【０００３】

【発明が解決しようとする課題】しかしながら、従来の図形表示装置で顔画像を作成する場合、自分の顔を各パーツ毎のパーツパターンの組み合せで作成する場合はともかく、他人の年齢相応の顔をいきなり各パーツ毎のパーツパターンの組み合せによって作成することは極めて困難で、作成に長時間がかかっていた。また、他人の年齢相応の顔を作成するには、特殊な技能を必要としていた。さらに、作成した後の顔画像から主観的に把握される年齢と、客観的に把握される年齢とでは大きな差がある場合が多いという問題点があった。

【０００４】そこで本発明は、年齢に相応しい顔画像を迅速かつ容易に作成することができ、しかも顔画像から主観的に把握される年齢と客観的に把握される年齢との食い違いを客観的に評価可能な顔画像作成装置を提供することを目的としている。

【０００５】

【課題を解決するための手段】上記目的達成のため、請

求項１記載の発明による顔画像作成装置は、顔画像を表す各パーツ毎のパーツパターンを記憶するパーツパターン記憶手段と、年齢に応じた顔特徴データを記憶する顔特徴データ記憶手段と、年齢に関するデータを指定する指定手段と、この指定手段により年齢に関するデータが指定されると、当該データに応じた顔特徴データを前記顔特徴データ記憶手段から読み出し、その顔特徴データに応じて前記パーツパターン記憶手段から対応する各パーツ毎のパーツパターンを読み出し組み合せて顔画像を作成する顔画像作成手段と、を備えたことを特徴とする。

【０００６】また、好ましい態様として、前記顔特徴データ記憶手段は、年齢に応じた顔特徴データとして顔の縦横比、目の高さ、目の大きさ、しわの本数、髪際の後退度を記憶するようにしてもよい。前記指定手段は、年齢に関するデータとして実際の年齢、生年月日のうち少なくとも１つを指定するようにしてもよい。前記前記顔画像作成手段によって作成された顔画像を表示、又は印刷する手段を、さらに有するようにしてもよい。

【０００７】請求項５記載の発明による顔画像作成装置は、各パーツ毎のパーツパターンを組み合せて構成された顔画像データを記憶する顔画像データ記憶手段と、この顔画像データ記憶手段に記憶されている顔画像データに対応した年齢に関するデータを記憶する年齢データ記憶手段と、年齢に応じた顔特徴データを記憶する顔特徴データ記憶手段と、年齢に関するデータを指定する指定手段と、この指定手段により年齢に関するデータが指定されると、その指定データと、前記年齢データ記憶手段に記憶されている年齢に関するデータとに基づいて年齢差データを出力する年齢差出力手段と、前記顔画像データ記憶手段から顔画像データを読み出して基本となる顔画像を作成するとともに、前記年齢差出力手段から出力された年齢差データと、前記顔特徴データ記憶手段に記憶されている顔特徴データとに基づいて、前記顔特徴データ記憶手段に記憶されている顔特徴データを変更し、この変更した顔特徴データに基づいて前記基本となる顔画像を修正して新たな顔画像を作成する顔特徴データ作成手段と、を備えたことを特徴とする。

【０００８】また、好ましい態様として、前記顔画像データ記憶手段は、自分の顔あるいは他人の顔についての顔画像データを記憶するようにしてもよい。前記年齢データ記憶手段は、年齢に関するデータとして実際の年齢、生年月日、何年先、何年後のうち少なくとも１つを記憶するようにしてもよい。前記顔特徴データ記憶手段は、年齢に応じた顔特徴データとして顔の縦横比、目の高さ、目の大きさ、しわの本数、髪際の後退度を記憶するようにしてもよい。前記指定手段は、年齢に関するデータとして実際の年齢、生年月日、何年先、何年後のうち少なくとも１つを指定するようにしてもよい。前記顔特徴データ作成手段は、前記顔特徴データ記憶手段に記

憶されている顔特徴データの変更処理として、顔の縦横比に応じた輪郭のパーツの変更、目の位置の変更、髪型の変更、しわの追加を行い、この変更した顔特徴データに基づいて過去の顔あるいは未来の予想顔を作成するようにしてもよい。前記顔特徴データ作成手段によって作成された新たな顔画像を表示、又は印刷する手段を、さらに有するようにしてもよい。

【０００９】

【作用】請求項１記載の発明では、指定手段により年齢に関するデータを指定すると、当該データに応じた顔特徴データが顔特徴データ記憶手段から読み出され、その顔特徴データに応じてパーツパターン記憶手段から対応する各パーツ毎のパーツパターンが読み出されて組み合せることにより、顔画像（例えば、自分の顔あるいは他人の顔）が自動的に作成される。したがって、特殊な技能を必要とすることなく、年齢に相応しい顔画像を迅速かつ容易に作成することができる。また、作成した顔画像から主観的に把握される年齢と、客観的に把握される年齢との食い違いを客観的に評価することが可能になる。

【００１０】請求項５記載の発明では、予め顔画像（例えば、自分の顔あるいは他人の顔）と、そのときの年齢とが登録されており、その年齢と異なる他の年齢を指定すると、年齢データ記憶手段に記憶されている年齢に関するデータから年齢差データが出力され、この年齢差データと、顔特徴データ記憶手段に記憶されている顔特徴データとに基づいて、顔特徴データ記憶手段に記憶されている顔特徴データを変更し、この変更した顔特徴データに基づいて基本となる顔画像を修正してその年齢に相応しい新たな顔画像（例えば、過去の顔あるいは未来の予想顔）が自動的に作成される。したがって、特殊な技能を必要とすることなく、精度の高い過去の顔又は未来の予想顔を簡単かつ迅速に作成することができる。

【００１１】

【実施例】以下、図面を参照して本発明の実施例について説明する。図１は本発明に係る顔画像作成装置の一実施例を示す構成図である。図１において、顔画像作成装置は大きく分けてＣＰＵ１、特徴スイッチ２、カーソルスイッチ３、表示スイッチ４、年齢入力キー５、プログラムＲＯＭ６、ワークＲＡＭ７、パーツ画面ＲＯＭ８、ＶＲＡＭ９、テーブルＲＯＭ１０および表示部１１によって構成される。ＣＰＵ１は装置全体を制御するもので、特徴スイッチ２、カーソルスイッチ３、表示スイッチ４、年齢入力キー５によって顔のパーツや特徴等の指定操作が行われると、その操作情報に応じてプログラムＲＯＭ６に格納されているプログラムに従い、年齢データに応じた顔特徴データをテーブルＲＯＭ１０から読み出し、その顔特徴データに応じてパーツ画面ＲＯＭ８から対応する各パーツ毎のパーツパターンを読み出して組み合せることにより、顔画像（例えば、自分の顔あるい

は他人の顔）を作成する処理を行う。ＣＰＵ１は顔画像作成手段としての機能を有する。

【００１２】特徴スイッチ２は顔の特徴を指定するスイッチであり、顔を構成する各パーツ（例えば、髪型、顔の輪郭、眉、目、鼻、口等）を順番に指定するものである。本実施例では顔を構成する各パーツとして６個用意されている。カーソルスイッチ３は表示部１１に表示された顔画像について、顔を構成する各パーツ（例えば、髪、眉、目、鼻、口等）を択一的に選択するものである。具体的には、画面上のカーソル位置（例えば、点滅状態で表される）を動かすことにより、パーツを選択する。なお、カーソルスイッチ３の他に、マウス等を用いてもよい。マウスの使用は他のスイッチについても同様である。

【００１３】表示スイッチ４は顔画像を表示部１１に表示させて修正したり、作成した顔画像が所望の状態であるとき、でき上がり画面としてセットしたりするときに操作されるものである。年齢入力キー５は年齢に関するデータを入力して指定するもので、年齢に関するデータとしては実際の年齢、生年月日がある。年齢入力キー５は、例えば年齢あるいは生年月日を簡単に入力できるようにテンキーが用いられる。年齢入力キー５は年齢に関するデータを指定する指定手段を構成する。

【００１４】プログラムＲＯＭ６はＣＰＵ１の制御プログラムを格納しており、その内容は後述の各図に示される。ワークＲＡＭ７はＣＰＵ１の行う制御においてワークエリアとして用いられる。パーツ画面ＲＯＭ８は顔画像を表す各パーツ毎のパーツパターンを記憶しており、パーツパターン記憶手段を構成する。ここで、パーツ画面ＲＯＭ８に記憶されている各パーツ毎のパーツパターンの一例は図２のように示される。図２において、顔のパーツ種類（Ｎ）としては顔を構成する各種のものがある。この場合、顔のパーツ種類（Ｎ）として、（Ｎ）＝１は髪型、（Ｎ）＝２は顔の輪郭、（Ｎ）＝３は目、（Ｎ）＝４は眉毛というに複数種用意されている。なお、パーツ種類（Ｎ）は図２に示した例に限らず、他にも、例えば鼻、口というものが用意されている。また、この他のパーツ種類（Ｎ）を用意してもよい。

【００１５】一方、パーツパターンは各パーツの変形態様（特に、年齢に応じた特徴を有する）であり、図２の例で、例えば（Ｎ）＝１の男性の髪型に着目すると、この髪型のパーツパターンＮＯ．として［０１］、［０２］、［０３］・・・・というように各種のタイプに対応して複数種のものが予め設けられ、パーツ画面ＲＯＭ８に記憶されている。パーツパターンＮＯ．が大きくなるに従って年齢が上がるように配置されている。同様に、顔の輪郭、目、眉毛についても各パーツパターンが予め用意されている。また、各パーツパターンについては、さらにそのバリエーションが予め用意されて記憶されており、例えばパーツパターンＮＯ．［０３］の輪郭

パターンのバリエーションとしては図３に示すようなものがある。図３では［Ａ－１１］から［Ａ－４４］までの１６種類の各輪郭パターンがあり、これらは多様な顔の輪郭が存在するという実情に合せて各種のバリエーションがある。

【００１６】ＶＲＡＭ９は顔画像を作成するときに、その作成画像を１画面単位で記憶するもので、ＶＲＡＭ９としては、例えば半導体メモリが用いられる。テーブルＲＯＭ１０は年齢に応じた顔特徴データを記憶するもので、顔特徴データ記憶手段を構成する。年齢に応じた顔特徴データとしては、顔の縦横比、目の高さ、目の大きさ、しわの本数、髪際の後退度等がある。テーブルＲＯＭ１０に記憶されている顔特徴データを具体的に説明すると、例えば図４に示すようなものがある。図４では縦軸に顔の特徴を表すパーツとして目尻のしわ、額のしわ、ほおのしわ等・・・を配置し、横軸に３０歳から順次５歳ずつ年齢を区切って１００歳までの特徴を配置している。そして、例えば目尻のしわに着目すると、３０歳では目尻のしわがないが、年齢が上がるに従って目尻のしわが増えるように年齢に応じた顔の特徴（この場合は目尻のしわ）が予め記憶されている。なお、年齢に応じた顔の特徴は図４に示すような例に限らず、他の例でもよい。

【００１７】表示部（表示手段）１１はＣＰＵ１によって作成処理される画像を表示するもので、ＶＲＡＭ９との間でデータの授受を行いながら、作成途中で各パーツを選択するときの顔画像を表示したり、完成した顔画像を表示したりする。表示部１１は画像を表示するために、例えばＴＶディスプレイ７を有している。なお、画像を表示する部分はＴＶディスプレイに限らず、例えば専用のモニタ装置、あるいはＣＲＴを有するものでなく、ＬＣＤ等の液晶によって画像を表示するものでもよい。あるいは、他の用途にも兼用されているものを用いてもよい。

【００１８】次に、作用を説明する。図５は顔画像作成処理のメインプログラムを示すフローチャートである。このプログラムがスタートすると、まずステップＳ１０で初期設定を行う。初期設定では各種レジスタ、ワークＲＡＭ７、ＶＲＡＭ９のクリア、サブルーチンのイニシャライズ、フラグのリセット等が行われる。次いで、ステップＳ１２でポインタＭ１を［０］にクリアする。ポインタＭ１は顔の特徴、年齢等の情報を入力するときの指定用として用いられるもので、その値はＣＰＵ１内の対応するレジスタに格納される。

【００１９】次いで、ステップＳ１４でＶＲＡＭ９の内容を表示部１１に表示させる。これにより、例えば作成途中で各パーツを選択するときの顔画像や完成した顔画像が表示部１１に表示される。そして、以後はこのステップＳ１４に待機し、このとき各スイッチからの割り込み信号に基づいて必要な処理が行われる。すなわち、各

パーツを選択するときの処理等は、全て以下に示す割り込みルーチンで実行される。

【００２０】図６は特徴スイッチ割り込みルーチンを示すフローチャートである。特徴スイッチ２が操作されると、この特徴スイッチ割り込みルーチンに移行する。この割り込みルーチンに移行すると、まずステップＳ２０でポインタＭ１を［１］だけインクリメントする。次いで、ステップＳ２２でポインタＭ１が［９］に等しいか否かを判別する。ここで、ポインタＭ１を［９］と比較するのは、顔の特徴を表す顔特徴データとして８個あるので、８個を超えた値である［９］になったか否かを判断するためである。

【００２１】ポインタＭ１が［９］に等しくなければ、ステップＳ２６に進んでワークＲＡＭ７における（Ｍ１＋ＯＦＦＳＥＴ１）番地のデータをスタートアドレスとして画面データの内容をＶＲＡＭ９に転送する。例えば、Ｍ１＝１のときには（１＋ＯＦＦＳＥＴ１）番地のデータがスタートアドレスとなってワークＲＡＭ７の画面データの内容がＶＲＡＭ９に転送される。

【００２２】ここで、ワークＲＡＭ７には図７に示すように、（ＯＦＦＳＥＴ１＋１）番地から主に（ＯＦＦＳＥＴ５＋２）番地までの間に各種の必要なデータが一時的に格納される。例えば、（ＯＦＦＳＥＴ１＋１）番地をアドレスとするエリアは、ポインタＭ＝１によって指定されるＡＤＤ１なるデータが格納され、このデータはパーツ画面ＲＯＭ８に記憶されている各パーツ毎のアドレスに対応する。同様に、（ＯＦＦＳＥＴ１＋２）番地をアドレスとするエリアは、ポインタＭ＝２によって指定されるＡＤＤ２なるデータが格納され、以下、（ＯＦＦＳＥＴ１＋７）番地をアドレスとするエリアは、ポインタＭ＝７によって指定されるＡＤＤ７なるデータが格納される。最終的には少なくともポインタＭ＝８によって指定されるＡＤＤ８なるデータまで格納されている。

【００２３】ワークＲＡＭ７の他のエリアを説明すると、（ＯＦＦＳＥＴ２＋１）番地、（ＯＦＦＳＥＴ２＋２）番地・・・はカーソル位置に対応するデータが格納される。（ＯＦＦＳＥＴ３＋１）番地、（ＯＦＦＳＥＴ３＋２）番地・・・はｙレジスタで、年齢に関するデータが格納される。（ＯＦＦＳＥＴ４＋１）番地、（ＯＦＦＳＥＴ４＋２）番地・・・は顔の特徴を表すデータが格納される。具体的には、（ＯＦＦＳＥＴ４＋１）番地をアドレスとするエリアは、髪型に関するデータが格納されるもので、データの最上位ビット（ａで示す部分）には男性あるいは女性を区別する性別パラメータが格納される。性別パラメータは１ビット単位であり、［１］のとき男性を表し、［０］のとき女性を表す。

【００２４】また、（ＯＦＦＳＥＴ４＋１）番地をアドレスとするエリアのうち上位側のビット領域（上位ビット群）ｂには髪型に関するデータが格納され、同エリア

のうち下位側のビット領域（下位ビット群）ｃには髪型に関して年齢に応じた特徴データが格納される。

【００２５】（ＯＦＦＳＥＴ４＋２）番地をアドレスとするエリアは、顔の輪郭に関するデータが格納されるもので、データの最上位ビットａには性別パラメータが格納される。（ＯＦＦＳＥＴ４＋２）番地をアドレスとするエリアのうち上位ビット群ｂには顔の輪郭に関するデータが格納され、同エリアのうち下位ビット群ｃには顔の輪郭に関して年齢に応じた特徴データが格納される。（ＯＦＦＳＥＴ４＋３）番地をアドレスとするエリアは、目に関するデータが格納されるもので、データの最上位ビットａには性別パラメータが格納される。（ＯＦＦＳＥＴ４＋３）番地をアドレスとするエリアのうち上位ビット群ｂには目に関するデータが格納され、同エリアのうち下位ビット群ｃには目に関して年齢に応じた特徴データが格納される。

【００２６】以下、同様にして（ＯＦＦＳＥＴ４＋４）番地をアドレスとするエリアは、眉毛に関するデータが格納されるという具合に順次データ（例えば、鼻、口等）が格納される。なお、顔の特徴パーツのうち、年齢に応じて変化が著しいのは上述した髪型、輪郭、目の３種類であり、したがって、年齢に応じた特徴データとしては、これら３種類（髪型、輪郭、目）について年齢に応じて変化した態様が特徴データとして格納される。（ＯＦＦＳＥＴ５＋１）番地、（ＯＦＦＳＥＴ５＋２）番地・・・は顔のしわを表すデータが格納される。具体的には、（ＯＦＦＳＥＴ５＋１）番地をアドレスとするエリアには、目尻のしわに関するデータが格納され、（ＯＦＦＳＥＴ５＋２）番地をアドレスとするエリアには、額のしわに関するデータが格納され、（ＯＦＦＳＥＴ５＋３）番地をアドレスとするエリアには、ほおのしわに関するデータが格納される。

【００２７】さて、例えば前述したようにポインタＭ１＝１のときには（１＋ＯＦＦＳＥＴ１）番地のデータがスタートアドレスとなってワークＲＡＭ７の画面データの内容がＶＲＡＭ９に転送されるが、このときワークＲＡＭ７における（１＋ＯＦＦＳＥＴ１）番地のデータはＡＤＤ１であり、その内容は図８に示すようにパーツ画面ＲＯＭ８に記憶されている各パーツ毎の画面のうちの１つである。図８において、ＡＤＤ１のアドレスに対応する画面データは性別を選択する画面であり、したがって、Ｍ１＝１のときはＡＤＤ１に対応して図９（ａ）に示すような画面が表れ、［０１］：男性あるいは［０２］：女性のどちらかの指定を促す画面が表れる。

【００２８】同様に、図８においてＡＤＤ２のアドレスに対応する画面データは髪型を選択する画面であり、例えば［０１］は髪の量が豊かで七三分け、［０２］は髪の量が薄くて七三分け、・・・・というようになっている。このＡＤＤ２に対応して図９（ｂ）に示すように髪型の選択を促す画面する画面が表れる。ＡＤＤ３のア

ドレスに対応する画面データは顔の輪郭を選択する画面であり、例えば［０１］、［０２］、・・・・・というようになっている。このＡＤＤ３に対応して図示は略しているが、顔の輪郭の選択を促す画面する画面が表れる。ＡＤＤ４のアドレスに対応する画面データは目を選択する画面であり、例えば［０１］は目が丸型で二重まぶた、［０２］は目が卵型、［０３］は目がきつね卵・・・・というようになっている。このＡＤＤ４に対応して図９（ｃ）に示すように目の形の選択を促す画面する画面が表れる。

【００２９】ＡＤＤ５のアドレスに対応する画面データは眉毛を選択する画面であり、例えば［０１］は眉毛が三ケ月形、［０２］は眉毛が雨端さがり型、・・・・・というようになっている。このＡＤＤ５に対応して図９（ｄ）に示すように眉毛の形の選択を促す画面する画面が表れる。ＡＤＤ６のアドレスに対応する画面データは鼻を選択する画面であり、例えば［０１］、［０２］、・・・・・というようになっている。このＡＤＤ６に対応して図示は略しているが、鼻の選択を促す画面する画面が表れる。ＡＤＤ７のアドレスに対応する画面データは口を選択する画面であり、例えば［０１］、［０２］、・・・・・というようになっている。このＡＤＤ７に対応して図示は略しているが、口の選択を促す画面する画面が表れる。また、ＡＤＤ８のアドレスに対応する画面データは年齢の入力を要請する画面であり、このＡＤＤ８に対応して図示は略しているが、年齢入力キー５からの年齢の入力を促す画面する画面が表れる。

【００３０】再び図６の説明に戻り、ステップＳ２６の処理を経ると、リターンする。そして、次の特徴スイッチ割り込みルーチンになると、同様の処理を繰り返す。このとき、まずステップＳ２０でポインタＭ１をインクリメントし、ステップＳ２２でポインタＭ１が［９］に等しくなると、ステップＳ２４に進んでポインタＭ１を［１］に戻し、その後、ステップＳ２６に進む。このようにして特徴スイッチ２が操作される度にポインタＭ１を［１］ずつインクリメントしていき、ポインタＭが［９］に等しくなると再びポインタＭ１を［１］に戻すことが行われる。したがって、ポインタＭ１＝１に対応するワークＲＡＭ７の（Ｍ１＋ＯＦＦＳＥＴ１）番地のデータをスタートアドレスとして画面データの内容がＶＲＡＭ９に転送され、以後、特徴スイッチ２が操作される度にポインタＭ１が［１］ずつインクリメントされて（Ｍ１＋ＯＦＦＳＥＴ１）番地の画面データの内容がＶＲＡＭ９に転送され、表示部１１に表示される。

【００３１】特徴スイッチ２が操作される度毎の画面データの内容は、図９に示すように変化する。すなわち、特徴スイッチ２を操作すれば、その都度、特徴スイッチ割り込みルーチンに移行し、図９に示す画面が表れる。オペレータは、この図９に示す画面を見ながら性別、髪型、目、眉毛、・・・・等について顔の特徴を選択していくことになる。

【００３２】図１０は年齢スイッチ割り込みルーチンを示すフローチャートである。年齢入力キー５が操作されると、この年齢スイッチ割り込みルーチンに移行する。この割り込みルーチンに移行すると、まずステップＳ５０でｙレジスタに年齢入力キー５の操作によって入力された年齢データを格納する。例えば、年齢が３０歳と入力されると、［３０］という年齢データをｙレジスタに格納する。次いで、ステップＳ５２でワークＲＡＭ７の（ＯＦＦＳＥＴ３）番地にｙレジスタの内容（すなわち、年齢データ）を書き込む。次いで、ステップＳ５４でポインタＭを［１］にセットする。ポインタＭ＝１は髪型、Ｍ＝２は輪郭、Ｍ＝３は目、・・・・というように対応しているから、ステップＳ５４でポインタＭを［１］にセットするのは、最初に髪型という特徴データを選択し、次いで、輪郭という具合に順次年齢に応じた特徴データ（例えば、パーツパターン）を選択するためである。

【００３３】次いで、ステップＳ５６に進んでポインタＭが［１］～［３］の範囲であるか否かを判別する。ポインタＭが［１］～［３］の範囲にある場合とは、顔の特徴データとして髪型、輪郭、目の特徴データを選択するルーチンであるか否かを判断するものである。これらの髪型、輪郭、目という特徴データは、年齢に対応して変化させる必要が大きいからである。ステップＳ５６でＹＥＳのとき、すなわちポインタＭが［１］～［３］の範囲にあって髪型、輪郭、目の何れかの特徴データを選択するルーチンであるときは、ステップＳ５８に進んでｙレジスタの内容をＭ番目のテーブルで変換する。例えば、ポインタＭが［１］で髪型の特徴データを選択するルーチンであるときは、ｙレジスタの内容を１番目のテーブルで変換する。１番目のテーブルには、年齢に応じた髪型の特徴データ（例えば、パーツパターン）が入っているから、このとき入力された年齢（ｙレジスタの内容）に応じて髪型のパーツパターンに変換される。

【００３４】次いで、ステップＳ６０で変換されたデータ（パーツパターン）を（ＯＦＦＳＥＴ４＋Ｍ）番地をアドレスとするエリアの下位ビット群ｃにストアする。例えば、ポインタＭが［１］で髪型の特徴データを選択するルーチンであるときは、年齢に応じた髪型のパーツパターンが下位ビット群ｃにストアされる。これにより、髪型について年齢に対応する特徴を表示させることが可能になる。同様に、ポインタＭが［２］で顔の輪郭の特徴データを選択するルーチンであるときは、年齢に応じた輪郭のパーツパターンが下位ビット群ｃにストアされる。また、ポインタＭが［３］で目の特徴データを選択するルーチンであるときは、年齢に応じた目のパーツパターンが下位ビット群ｃにストアされる。

【００３５】次いで、ステップＳ６１でポインタＭをインクリメントし、ステップＳ６２でポインタＭが［７］

になったか否かを判別する。これは、顔の特徴データとして髪型、輪郭、目、・・・・の６つの全ての特徴データの選択が終了したか否かを判断するものである。Ｍ＝［７］でなければステップＳ５６に戻って同様のループを繰り返す。そして、ステップＳ５６でポインタＭが［１］～［３］の範囲にないとき、すなわちポインタＭが［４］～［６］の範囲にあれば、ステップＳ６４に分岐する。このときは髪型、輪郭、目以外の比較的に年齢に対応して変化させる必要のない顔の特徴データに対する処理となる。そのため、ステップＳ６４では（ＯＦＦＳＥＴ４＋Ｍ）番地をアドレスとするエリアの下位ビット群ｃに所定値をストアする。所定値をストアするのは、髪型、輪郭、目以外の特徴データを一定の状態に固定するためである。例えば、ポインタＭが［４］で眉毛の特徴データを選択するルーチンであるときは、年齢にかかわらず一定の形状の眉毛のパーツパターンが下位ビット群ｃにストアされる。次いで、ステップＳ６１でポインタＭをインクリメントしてステップＳ６２の判別を行う。このようにしてＭ＝［７］になるまで上記ループを繰り返し、Ｍ＝［７］になると、本ルーチンを終了する。

【００３６】図１１はカーソルスイッチ割り込みルーチンを示すフローチャートである。カーソルスイッチ３が操作されると、このカーソルスイッチ割り込みルーチンに移行する。この割り込みルーチンに移行すると、まずステップＳ８０で画像データを表示中であるか否かを判別する（例えば、表示フラグにより判断する）。これは、表示部１１に何等かの画面が表示されているか否かを判断するもので、画面が表示されていなければカーソルが現れていないからである。したがって、画像データを表示中でなければ今回のルーチンはリターンする。

【００３７】一方、画像データを表示中のときは続くステップＳ８２に進んでワークＲＡＭ７の（Ｍ＋ＯＦＦＳＥＴ２）番地のデータをカーソル位置に応じて変更する。（ＯＦＦＳＥＴ２）番地はカーソル位置に対応するデータを格納するものであるから、例えば、Ｍ＝１のときは髪型に関して（ＯＦＦＳＥＴ２＋１）番地のデータがカーソル位置に応じて変更される。また、Ｍ＝２のときは輪郭に関して（ＯＦＦＳＥＴ２＋２）番地のデータがカーソル位置に応じて変更される。例えば、パーツパターンを選択するためにカーソルスイッチ３を操作した場合に、図２に示すような輪郭に関する各種のパーツパターンのバリエーションのうちの１つをカーソルで選択する。

【００３８】次いで、ステップＳ８４でカーソル位置の表示を変更する。これにより、カーソルスイッチ３を操作して動かした場合には、その表示位置が変更されて画面に示される。次いで、ステップＳ８６でポインタＭが［１］であるか否かを判別する。すなわち、性別を判断する画面であるか否かを判別する。Ｍ＝［１］のときは

ステップＳ８８に進んで（ＯＦＦＳＥＴ２＋Ｍ）番地のデータが男を表すか否かを判別する。男を表すものであるときは、まずステップＳ９０でＮ＝１に戻す。Ｎは性別ポインタである。これは、性別ポインタＮを最小の値、すなわち（ＯＦＦＳＥＴ２＋１）番地に対応するエリアから順次インクリメントしていくためである。（ＯＦＦＳＥＴ４＋Ｍ）番地は顔の特徴を表すデータが格納され、そのデータの最上位ビットＭＳＢ（ａで示す部分）には男性あるいは女性を区別する性別パラメータが格納される。性別パラメータは１ビット単位であり、「１」のとき男性を表し、「０」のとき女性を表す。

【００３９】次いで、ステップＳ９２に進んで（ＯＦＦＳＥＴ４＋Ｎ）番地のデータのＭＳＢを「１」にセットする。このとき、Ｎ＝１であるから、まず（ＯＦＦＳＥＴ４＋１）番地のデータのＭＳＢが「１」にセットされることになる。次いで、ステップＳ９４で性別ポインタＮをインクリメントする。これにより、Ｎ＝２となる。次いで、ステップＳ９６でＮ＝７になったか否かを判別する。Ｎ＝７を判断するのは、（ＯＦＦＳＥＴ４＋Ｎ）番地の最大番地まで、そのＭＳＢを「１」にセットするためである。今回はＮ＝７でないから、ステップＳ９２に戻って同様の処理を繰り返す。したがって、今度はＮ＝２であるから、（ＯＦＦＳＥＴ４＋２）番地のデータのＭＳＢが「１」にセットされる。以下同様にして、（ＯＦＦＳＥＴ４＋３）番地、・・・（ＯＦＦＳＥＴ４＋６）番地の各データのＭＳＢがそれぞれ「１」にセットされていく。

【００４０】そして、ステップＳ９６でＮ＝７になると、今回のカーソルスイッチ割り込みルーチンを終了してメインプログラムにリターンする。一方、ステップＳ８６でポインタＭが［１］でないときは、ステップＳ１０６にジャンプして（ＯＦＦＳＥＴ２＋Ｍ）番地の内容を｛（ＯＦＦＳＥＴ４＋（Ｍ－１）｝番地のデータのＭＳＢを除く上位ビット群ｂに転送する。これにより、カーソルスイッチ３によって指定された位置のデータ内容が顔の特徴データを格納するエリアに転送されることになる。ステップＳ１０６を経ると、カーソルスイッチ割り込みルーチンを終了してメインプログラムにリターンする。また、ステップＳ８８でＮＯのとき、すなわち（ＯＦＦＳＥＴ２＋Ｍ）番地のデータが男を表すものでなく、女を表すものであるときは、ステップＳ９８に進んで性別ポインタＮをＮ＝１に戻す。これは、性別ポインタＮを最小の値、すなわち（ＯＦＦＳＥＴ２＋１）番地に対応するエリアから順次インクリメントしていくためである。

【００４１】次いで、ステップＳ１００で（ＯＦＦＳＥＴ４＋Ｎ）番地のデータのＭＳＢを「０」にセットする。このとき、Ｎ＝１であるから、まず（ＯＦＦＳＥＴ４＋１）番地のデータのＭＳＢが「０」にセットされることになる。次いで、ステップＳ１０２で性別ポインタ

Ｎをインクリメントする。これにより、Ｎ＝２となる。次いで、ステップＳ１０４でＮ＝７になったか否かを判別する。Ｎ＝７を判断するのは、（ＯＦＦＳＥＴ４＋Ｎ）番地の最大番地まで、そのＭＳＢを「０」にセットするためである。今回はＮ＝７でないから、ステップＳ１００に戻って同様の処理を繰り返す。したがって、今度はＮ＝２であるから、（ＯＦＦＳＥＴ４＋２）番地のデータのＭＳＢが「０」にセットされる。以下同様にして、（ＯＦＦＳＥＴ４＋３）番地、・・・（ＯＦＦＳＥＴ４＋６）番地の各データのＭＳＢがそれぞれ「０」にセットされていく。そして、ステップＳ１０４でＮ＝７になると、今回のカーソルスイッチ割り込みルーチンを終了してメインプログラムにリターンする。

【００４２】図１２は表示スイッチ割り込みルーチンを示すフローチャートである。表示スイッチ４が操作されると、この表示スイッチ割り込みルーチンに移行する。この割り込みルーチンに移行すると、まずステップＳ１５０で表示フラグを反転させる。したがって、表示フラグは、表示スイッチ４が操作される度に反転する。例えば、最初は表示フラグが「０」で、操作されると、表示フラグが「１」になり、以後、操作毎に「０」、「１」を繰り返す。このようにして、前回のルーチンに対して表示スイッチ４が操作されたか否かを判断する。

【００４３】次いで、ステップＳ１５２で表示フラグが「１」であるか否かを判別する。表示フラグが「１」ということは、例えば最初のルーチンの場合である。このときはステップＳ１５４に分岐してＭ１＝１とし、さらに（ＯＦＦＳＥＴ１＋１）番地にストアされた内容をスタートアドレスにした画面データをＶＲＡＭ９に転送する。このとき、ワークＲＡＭ７における（ＯＦＦＳＥＴ１＋１）番地のデータはＡＤＤ１であり、ＡＤＤ１のアドレスに対応する画面データは性別を選択する画面である。したがって、ＡＤＤ１に対応して最初は図９（ａ）に示すような画面が表示部１１に表示される。この画面に従ってオペレータはカーソルスイッチ３を操作して［０１］：男性あるいは［０２］：女性のどちらかを指定する。ステップＳ１５４を経ると、メインプログラムにリターンする。

【００４４】一方、最初のルーチンを終了した後は、表示スイッチ４が操作される度に表示フラグが反転するので、次回はステップＳ１５２の判別結果がＹＥＳになり、ステップＳ１５６に進む。ステップＳ１５６ではポインタＭを［１］に戻す。ポインタＭ＝１は髪型、Ｍ＝２は輪郭、Ｍ＝３は目、・・・・というように対応しているから、ステップＳ１５６でポインタＭを［１］に戻すのは、最初に髪型の特徴データを選択し、次いで、輪郭から年齢に応じた特徴データ（例えば、パーツパターン）を順次選択して表示させるためである。

【００４５】次いで、ステップＳ１５８でポインタＭが［３］であるか否かを判別する。Ｍ＝［３］は目の特徴データを指定するものである。これは、目だけは年齢に応じて上がるという特徴があるため、そのまま表示したのでは都合が悪いので、その位置を変えるためである。したがって、Ｍ＝［３］でなければ、目の特徴データを指定するルーチンではないと判断し、ステップＳ１６０に進み、（ＯＦＦＳＥＴ４＋Ｍ）番地にストアされた内容をスタートアドレスにした画面データをＶＲＡＭ９に転送する。このとき、ワークＲＡＭ７における（ＯＦＦＳＥＴ４＋Ｍ）番地のデータは顔を特徴データを格納するエリアである。目以外の特徴データに応じた顔画像が表示部１１に表示される。

【００４６】次いで、ステップＳ１６２でポインタＭをインクリメントし、ステップＳ１６４でポインタＭが［７］であるか否かを判別する。これは、顔の特徴データとして髪型、輪郭、目の６つの全ての特徴データの選択が終了したか否かを判断するものである。Ｍ＝［７］でなければステップＳ１５８に戻って同様のループを繰り返す。このとき、ステップＳ１５８でＭ＝［３］になると、ステップＳ１６６に分岐して目の特徴データを表示する処理を実行する。すなわち、ステップＳ１６６ではＯＦＦＳＥＴ３番地の内容をｙレジスタに転送する。すなわち、年齢データが転送される。

【００４７】次いで、ステップＳ１６８で（ＯＦＦＳＥＴ４＋Ｍ）番地にストアされた内容をスタートアドレスにした画面データを順次読み出し、ステップＳ１７０で読み出された画面データのｙ座標をｙレジスタの内容に基づいて変換してＶＲＡＭ９に転送する。これにより、目については年齢に応じてその位置（特に、ｙ座標位置）が変化し、年齢に相応しい顔画像が表示部１１に表示される。一般的には、年齢が上がると、目の位置が上がるような傾向にあるから、それに沿って目の位置が年齢に応じて修正された顔画像になる。ステップＳ１７０を経ると、ステップＳ１６２に進む。

【００４８】このようにしてポインタＭが［１］～［６］の範囲で上記処理が繰り返され、ステップＳ１６４でＭ＝［７］になると、ステップＳ１７２に進む。ステップＳ１７２ではｙレジスタの値が［３０］より小さいか否かを判別する。これは、年齢の指定が３０歳未満であるか否かを判断するものである。年齢が３０歳未満であれば、顔にしわが有る可能性が低いので、今回のルーチンを終了してメインプログラムにリターンする。一方、ステップＳ１７２ではｙレジスタの値が［３０］以上であり、年齢の指定が３０歳以上のときはステップＳ１７４に進む。ステップＳ１７４ではＯＦＦＳＥＴ５番地にストアされた内容（すなわち、目尻のしわ）をスタートアドレスにした画面データを順次読み出し、ステップＳ１７６で読み出された画面データのｙ座標をｙレジスタの内容に基づいて変換してＶＲＡＭ９に転送する。これにより、目尻のしわについては３０歳以上４０歳未満という年齢に応じて本数およびその位置（特に、ｙ座

標位置）が変化し、年齢に相応しい目尻のしわを有する顔画像が表示部１１に表示される。一般的には、年齢が上がると、目尻のしわの本数が多くなるとともに、目尻のしわの位置が変化するような傾向にあるから、それに沿って目尻のしわの数および位置が修正された顔画像になる。

【００４９】次いで、ステップＳ１７８に進み、ｙレジスタの値が［４０］より小さいか否かを判別する。これは、年齢の指定が３０歳以上で４０歳未満であるか否かを判断するものである。年齢が４０歳未満であれば、３０歳よりは額にしわが有る可能性が高いが、５０歳に比べてしわの数が少ないので、今回は３０歳～４０歳の範囲で額のしわ処理を行うものである。ステップＳ１７８でＹＥＳのとき、すなわち年齢の指定が４０歳以上のときは今回のルーチンを終了してメインプログラムにリターンする。一方、年齢の指定が３０歳以上で４０歳未満であるときは、ステップＳ１８０に進んで（ＯＦＦＳＥＴ５＋１）番地にストアされた内容（すなわち、額のしわ）をスタートアドレスにした画面データをＶＲＡＭ９に転送する。これにより、額のしわについては３０歳以上４０歳未満という年齢に応じてその本数が変化し、年齢に相応しい額のしわを有する顔画像が表示部１１に表示される。一般的には、年齢が上がると、額のしわの本数が多くなるような傾向にあるから、それに沿って額のしわの数が修正された顔画像になる。

【００５０】次いで、ステップＳ１８２に進み、ｙレジスタの値が［５０］より小さいか否かを判別する。これは、年齢の指定が４０歳以上で５０歳未満であるか否かを判断するものである。年齢が５０歳未満であれば、４０歳よりは顔のほおにしわが有る可能性が高いが、６０歳に比べてしわの数が少ないので、今回は４０歳～５０歳の範囲でほおのしわ処理を行うものである。ステップＳ１８２でＹＥＳのとき、すなわち年齢の指定が５０歳以上のときは今回のルーチンを終了してメインプログラムにリターンする。一方、年齢の指定が４０歳以上で５０歳未満であるときは、ステップＳ１８４に進んで（ＯＦＦＳＥＴ５＋２）番地にストアされた内容（すなわち、ほおのしわ）をスタートアドレスにした画面データをＶＲＡＭ９に転送する。これにより、ほおのしわについては４０歳以上５０歳未満という年齢に応じてその本数が変化し、年齢に相応しいほおのしわを有する顔画像が表示部１１に表示される。一般的には、年齢が上がると、ほおのしわの本数が多くなるような傾向にあるから、それに沿ってほおのしわの数が修正された顔画像になる。ステップＳ１８２を経ると、今回のルーチンを終了してメインプログラムにリターンする。

【００５１】このように本実施例では、本装置に対して電源を投入すると、最初は初期の顔画像が表示部１１に表示され、その画像を元にしてそれに修正を施しながら任意の３０歳の顔画像（基本となる顔画像）が手動選択

による各パーツパターンの組み合せで作成され、表示される。３０歳の顔画像の一例は図１３（ａ）のように示され、ここでは男性の顔画像をモデルとしている。その後、年齢入力キー５を操作して、例えば１０歳という年齢を入力すると、３０歳の顔画像（基本となる顔画像）の各パーツのうち、目のパーツパターンは１０歳に応じた下の位置に移動し、髪型は１０歳に応じた髪型に変更される等して、図１３（ｄ）に示すような１０歳の顔に相応しい顔画像が自動的に作成される。

【００５２】また、年齢入力キー５を操作して、例えば４０歳という年齢を入力すると、３０歳の顔画像（基本となる顔画像）の各パーツのうち、目のパーツパターンはやや上の位置に移動し、目尻のしわは追加（目尻の位置もやや移動）され、髪型は４０歳に応じた髪型に変更され、さらに口周りのしわが追加される等して、図１３（ｂ）に示すような４０歳の顔に相応しい顔画像が自動的に作成される。

【００５３】一方、年齢がうんと上がった例として、年齢入力キー５を操作して、例えば６５歳という年齢を入力すると、３０歳の顔画像（基本となる顔画像）の各パーツのうち、目のパーツパターンは更に上の位置に移動し、目尻のしわは更に追加（目尻の位置も移動）され、髪型は６５歳に応じた髪型に変更され、また、口周りのしわが更に追加される等して、図１３（ｃ）に示すような６５歳の顔に相応しい顔画像が自動的に作成される。

【００５４】したがって、特殊な技能を必要とすることなく、年齢に相応しい顔画像を迅速かつ容易に作成することができる。また、作成した顔画像から主観的に把握される年齢と、客観的に把握される年齢との食い違いを客観的に評価することができる。なお、性別による区分をすることにより、女性の顔をについても同様の処理で年齢に応じた顔画像を自動的に作成することができる。また、顔画像は自分の顔であってもよいし、あるいは他人の顔であっても、全く同様に年齢に応じた顔画像を自動的に作成することができる。さらに、年齢に応じた顔画像を表示部１１により表示する他に、例えば印刷部１１Ａを設け、この印刷部１１Ａによりラベルテープや普通紙等に印刷するようにしてもよい。

【００５５】

【発明の効果】請求項１記載の発明によれば、指定手段により年齢に関するデータを指定すると、当該データに応じた顔特徴データを顔特徴データ記憶手段から読み出し、その顔特徴データに応じてパーツパターン記憶手段から対応する各パーツ毎のパーツパターンを読み出して組み合せることにより、顔画像（例えば、自分の顔あるいは他人の顔）が自動的に作成しているので、特殊な技能を必要とすることなく、年齢に相応しい顔画像を迅速かつ容易に作成することができる。また、作成した顔画像から主観的に把握される年齢と、客観的に把握される年齢との食い違いを客観的に評価することができる。

【００５６】請求項５記載の発明によれば、予め顔画像（例えば、自分の顔あるいは他人の顔）と、その顔の年齢とを基本となる顔画像として登録しておき、その年齢と異なる他の年齢を指定すると、年齢データ記憶手段に記憶している年齢に関するデータから年齢差データを出力し、この年齢差データと顔特徴データ記憶手段に記憶している顔特徴データとに基づいて、顔特徴データ記憶手段に記憶している顔特徴データを変更し、この変更した顔特徴データに基づいて基本となる顔画像を修正してその年齢に相応しい新たな顔画像（例えば、過去の顔あるいは未来の予想顔）を自動的に作成するようにしているので、特殊な技能を必要とすることなく、基本顔と関連した精度の高い過去の顔又は未来の予想顔を簡単かつ迅速に作成することができる。

【図面の簡単な説明】

【図１】本発明に係る顔画像作成装置の一実施例の構成図である。

【図２】同実施例のパーツ画面ＲＯＭに記憶されている各パーツ毎のパーツパターンの一例を示す図である。

【図３】同実施例の輪郭パターンのバリエーションの一例を示す図である。

【図４】同実施例の年齢に応じた顔特徴データの一例を示す図である。

【図５】同実施例の顔画像作成処理のメインプログラムを示すフローチャートである。

【図６】同実施例の特徴スイッチ割り込みルーチンを示すフローチャートである。

【図７】同実施例のワークＲＡＭのデータ格納エリアの一例を示す図である。

【図８】同実施例のパーツ画面ＲＯＭに記憶されている各パーツ毎の画面データの一例を示す図である。

【図９】同実施例の表示画面の一例を示す図である。

【図１０】同実施例の年齢スイッチ割り込みルーチンを示すフローチャートである。

【図１１】同実施例のカーソルスイッチ割り込みルーチンを示すフローチャートである。

【図１２】同実施例の表示スイッチ割り込みルーチンを示すフローチャートである。

【図１３】同実施例の作成顔画像の一例を示す図である。

【符号の説明】

１　ＣＰＵ（顔画像作成手段、年齢差出力手段、顔特徴データ作成手段）

２　特徴スイッチ

３　カーソルスイッチ

４　表示スイッチ

５　年齢入力キー（指定手段）

６　プログラムＲＯＭ

７　ワークＲＡＭ

８　パーツ画面ＲＯＭ（パーツパターン記憶手段、顔画像データ記憶手段、年齢データ記憶手段、顔特徴データ記憶手段）

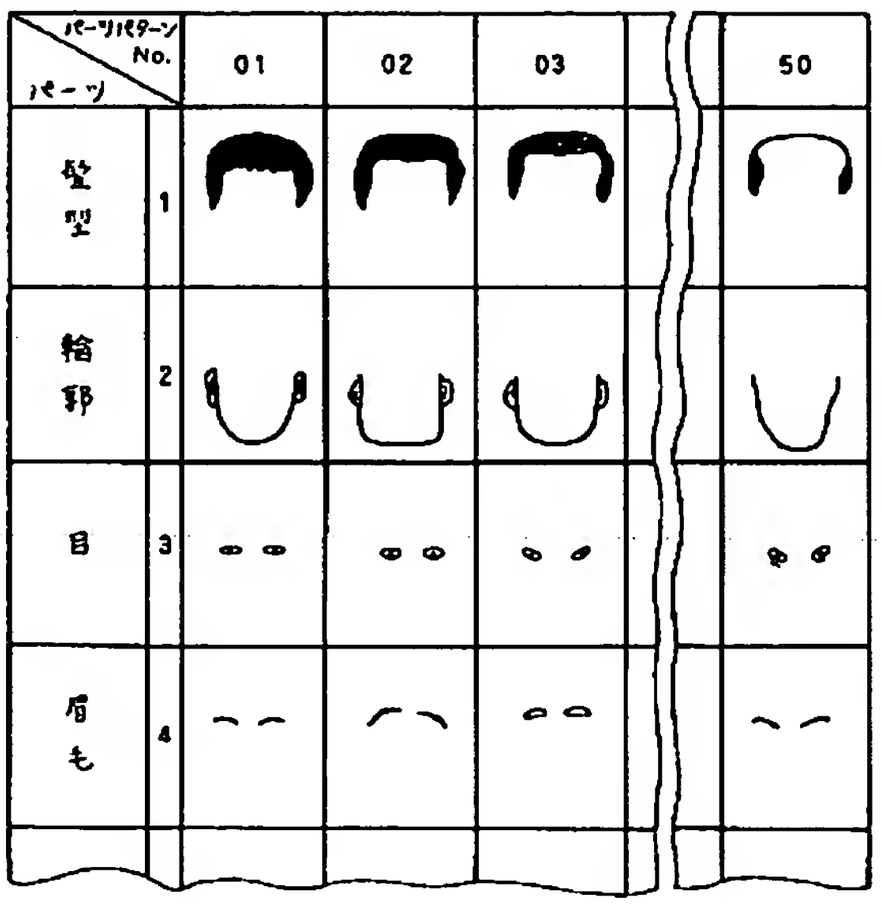
９　ＶＲＡＭ

１０　テーブルＲＯＭ（顔特徴データ記憶手段）

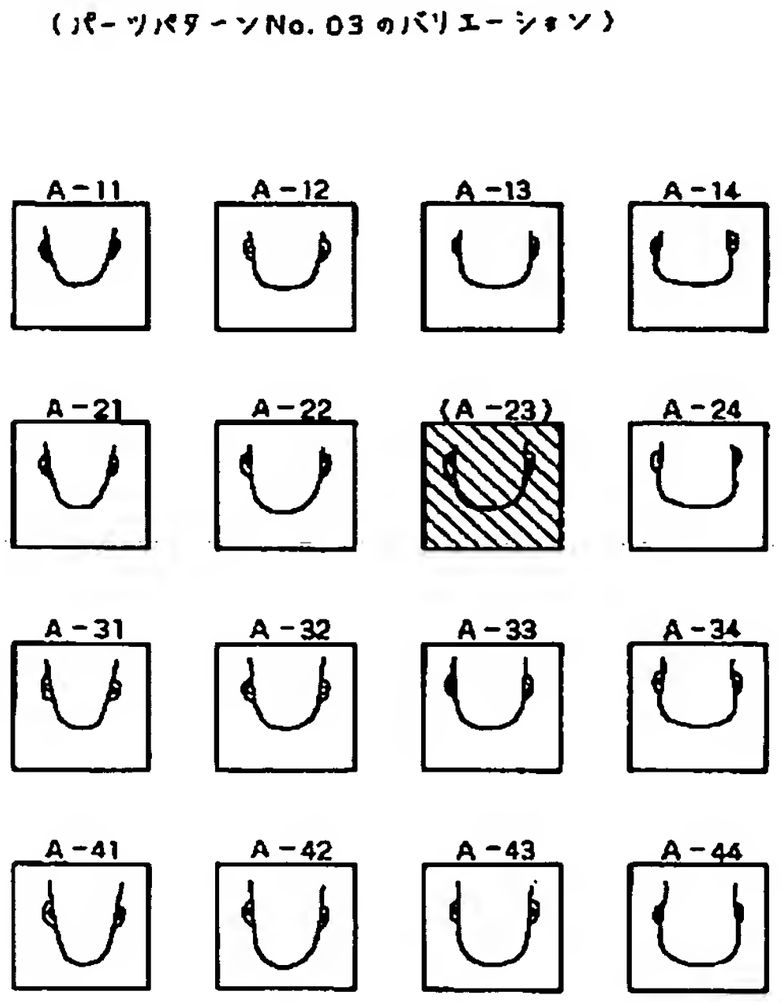
１１　表示部（表示手段）

１１Ａ　印刷部（印刷手段）

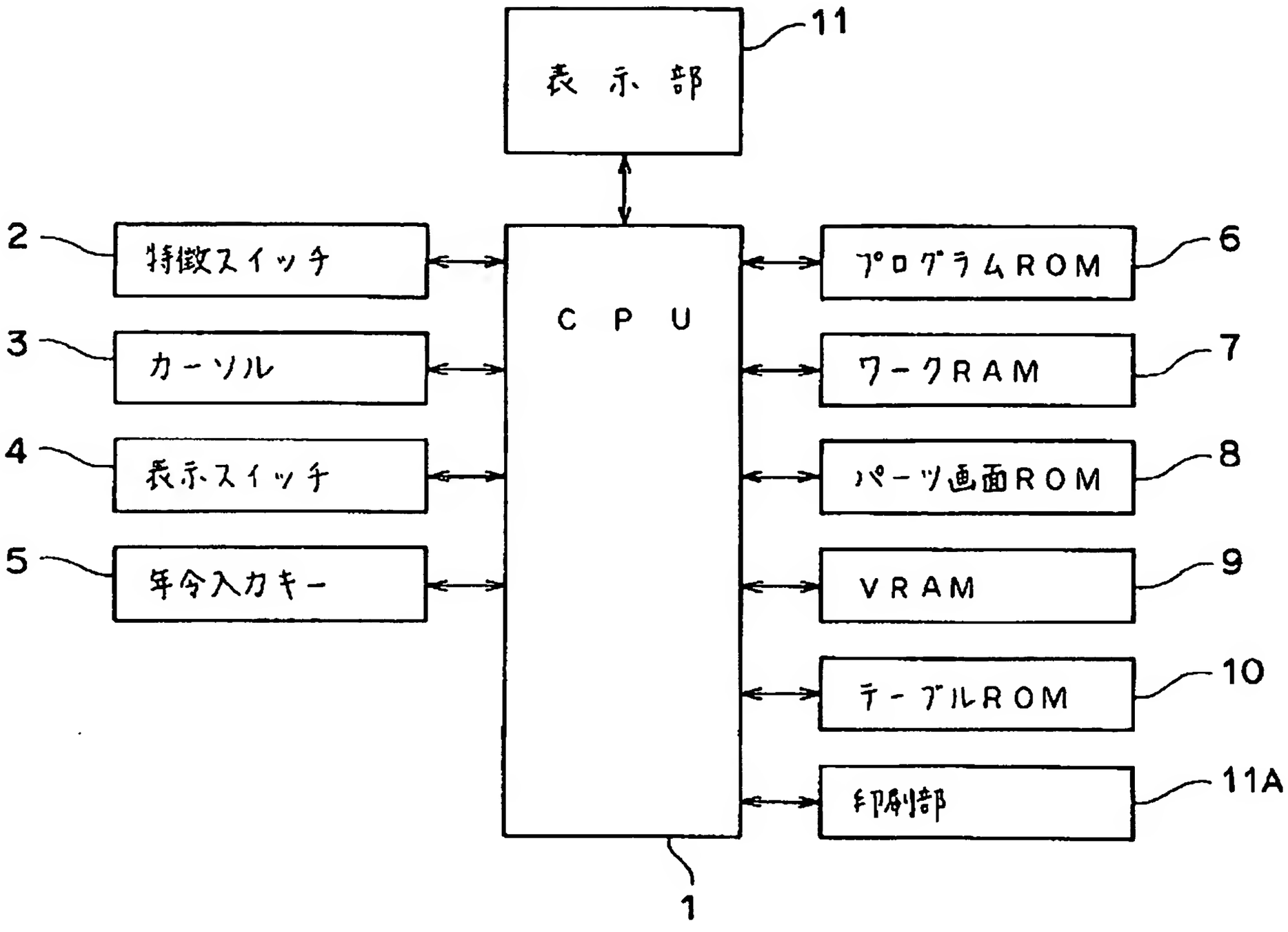
【図２】



【図３】



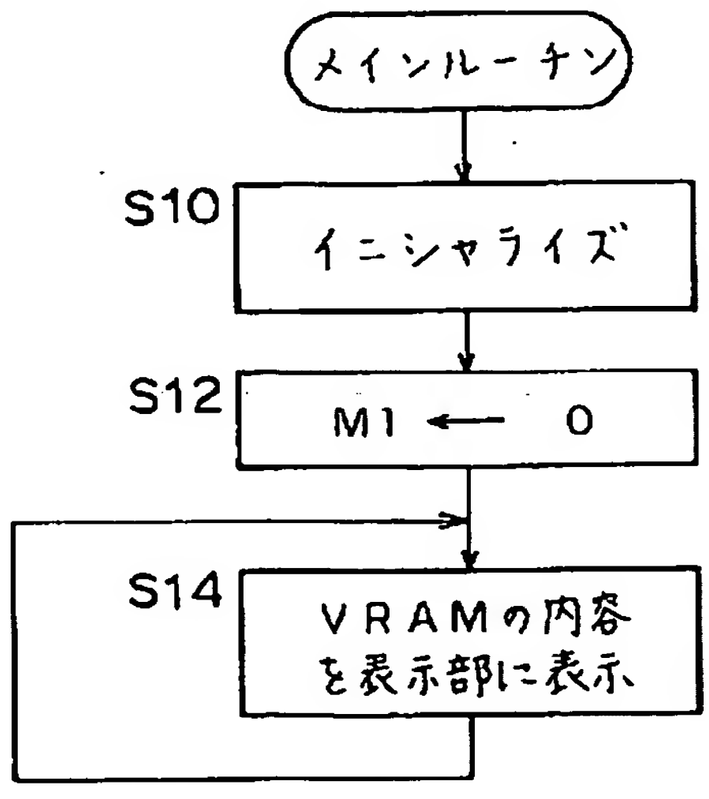
【図１】



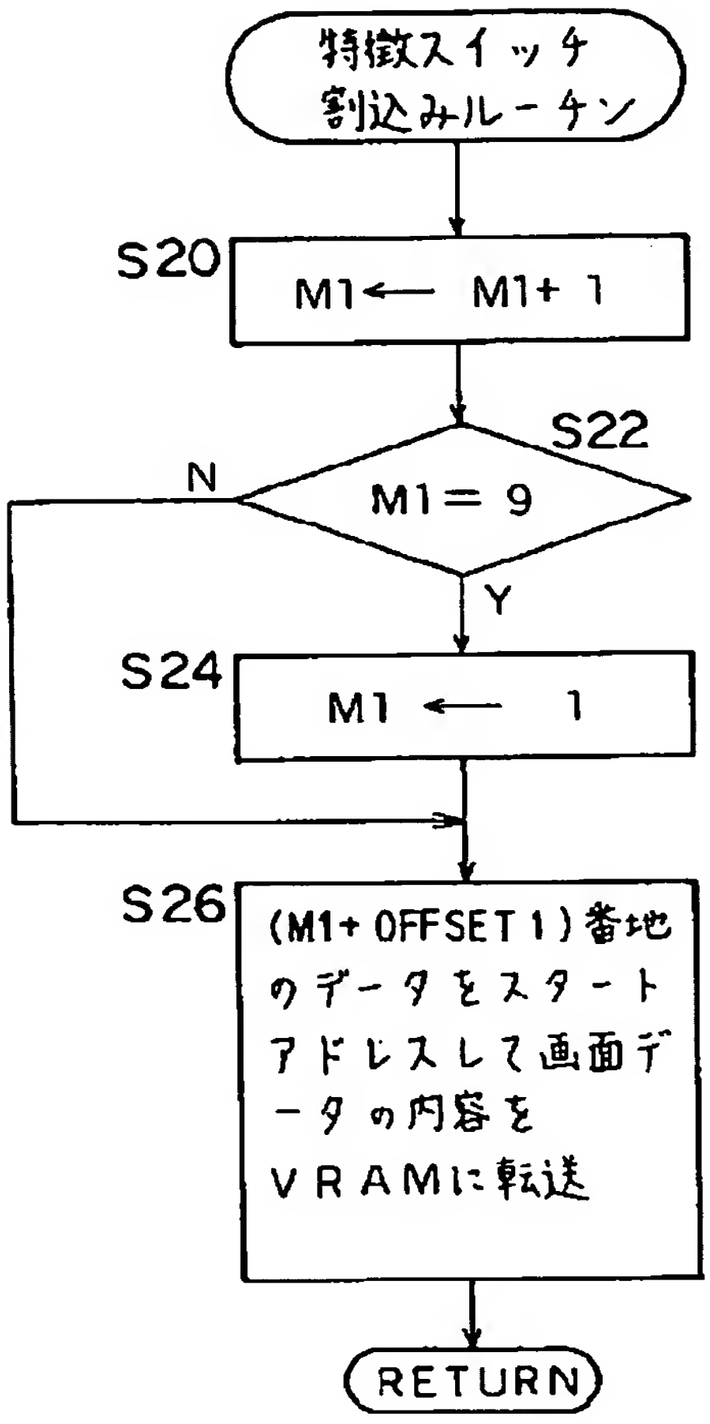
【図４】

年令(歳) / パーツ	30	35	40	…	100
目尻のしわ	(なし)	～	～	…	≋
頬のしわ	(なし)	―	―	…	≋
顎のしわ	(なし)	＼ ／	＼ ／	…	≋

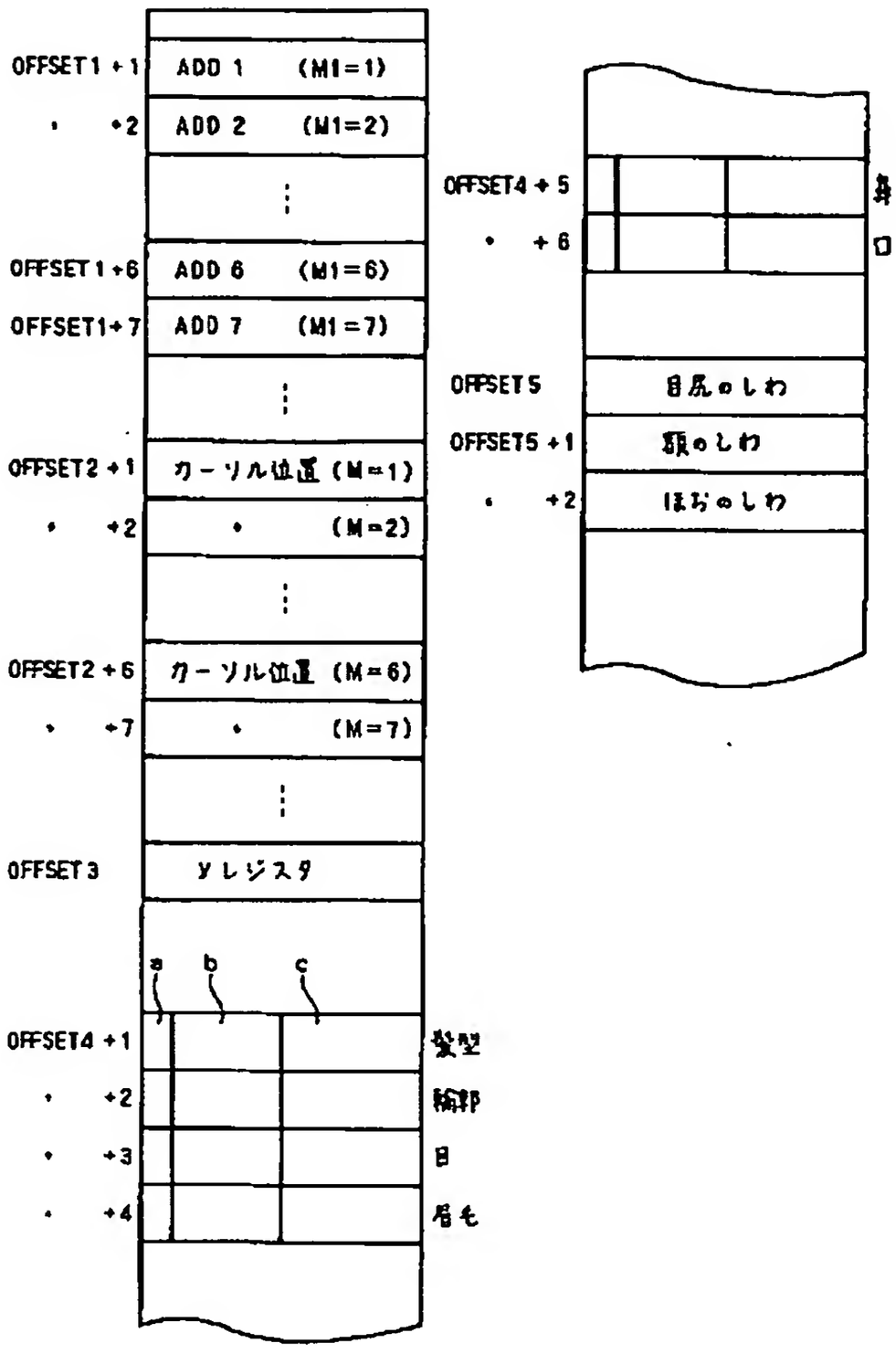
【図５】



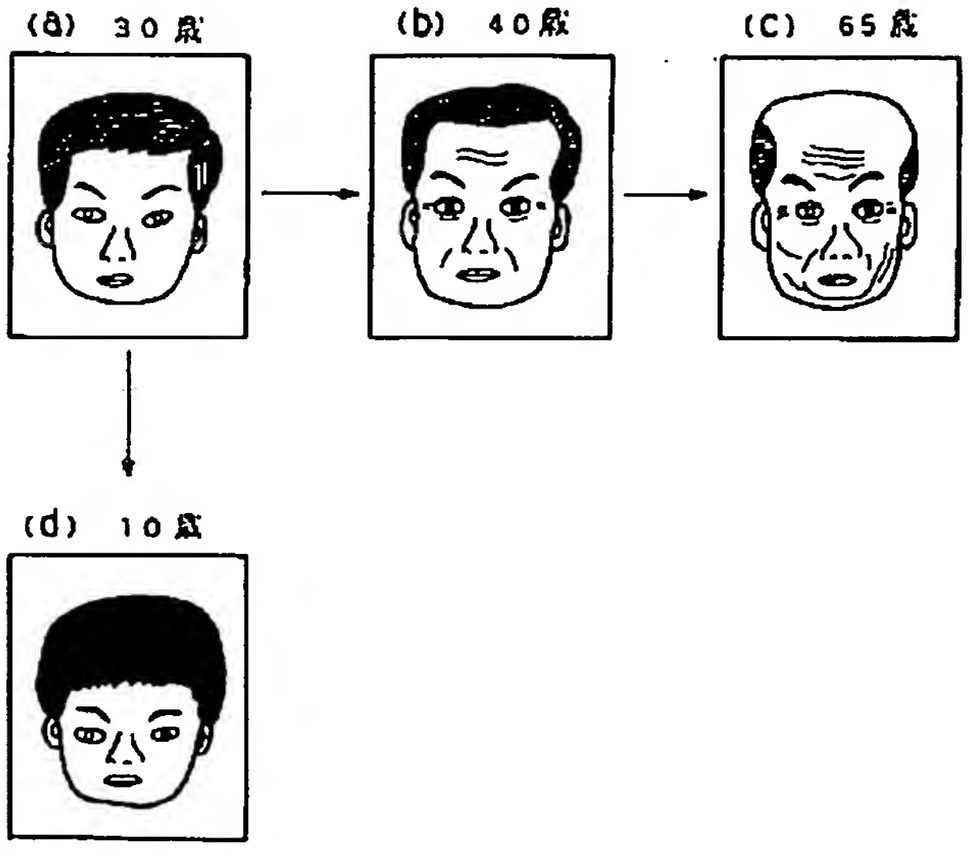
【図６】


特徴スイッチ
割込みルーチン
S20
M1← M1+ 1
S22
M1= 9
N
Y
S24
M1 ← 1
S26
(M1+ OFFSET 1)番地のデータをスタートアドレスして画面データの内容をVRAMに転送
RETURN

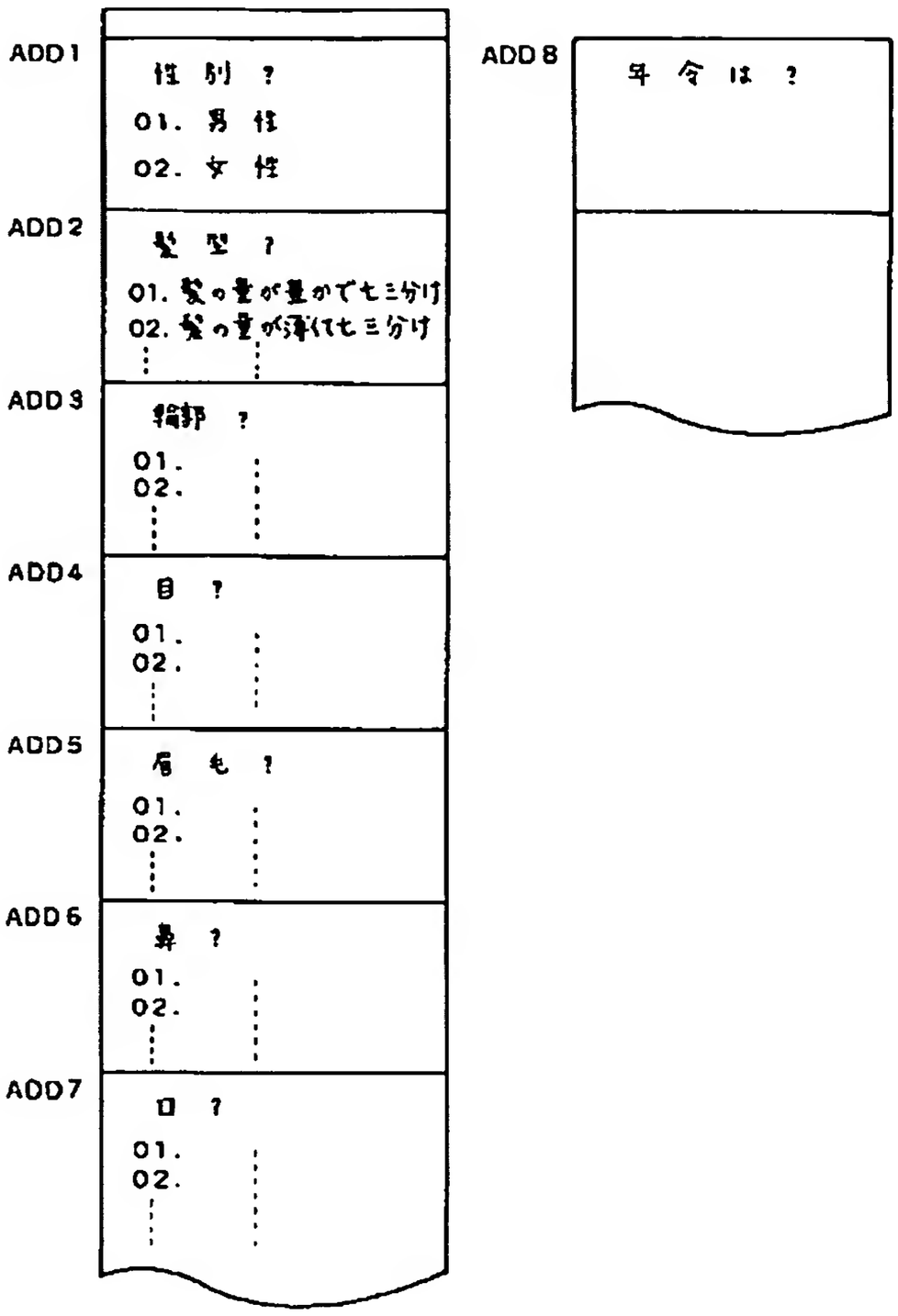
【図７】


OFFSET1 +1
ADD 1 (M1=1)
+2
ADD 2 (M1=2)
OFFSET1+6
ADD 6 (M1=6)
OFFSET1+7
ADD 7 (M1=7)
OFFSET2 +1
カーソル位置 (M=1)
+2
(M=2)
OFFSET2 +6
カーソル位置 (M=6)
+7
(M=7)
OFFSET3
メレジスタ
a
b
c
OFFSET4 +1
+2
+3
+4
髪型
輪郭
目
眉毛
OFFSET4 +5
+6
鼻
口
OFFSET5
目尻のしわ
OFFSET5 +1
頬のしわ
+2
ほうのしわ

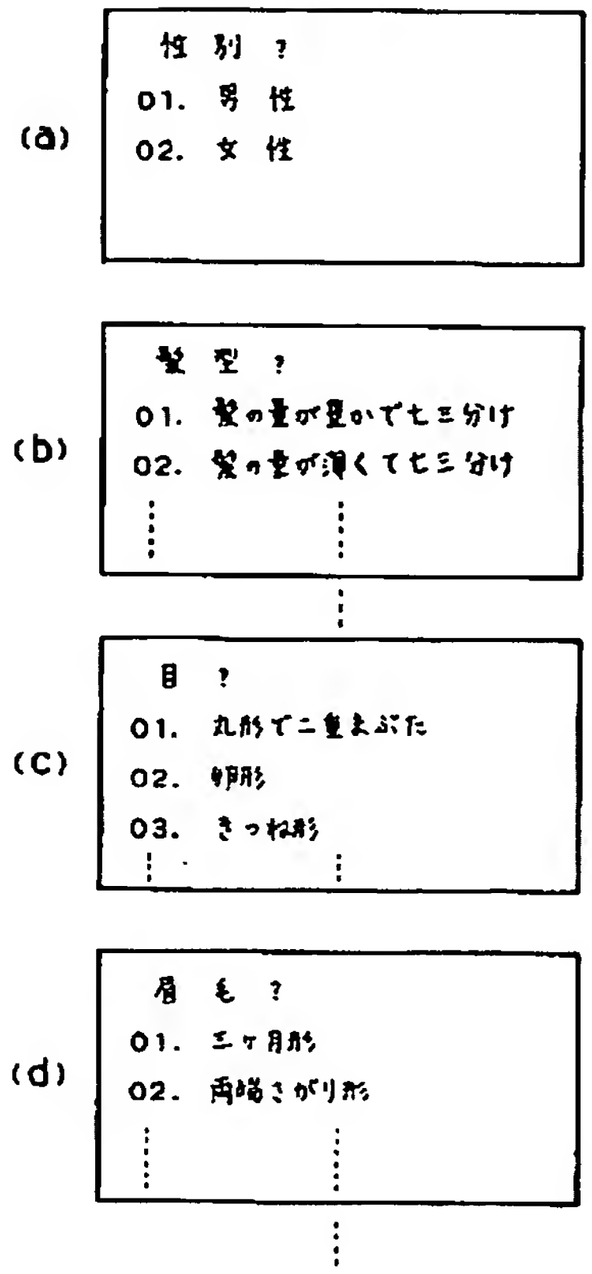
【図１３】


(a) 30歳
(b) 40歳
(C) 65歳
(d) 10歳

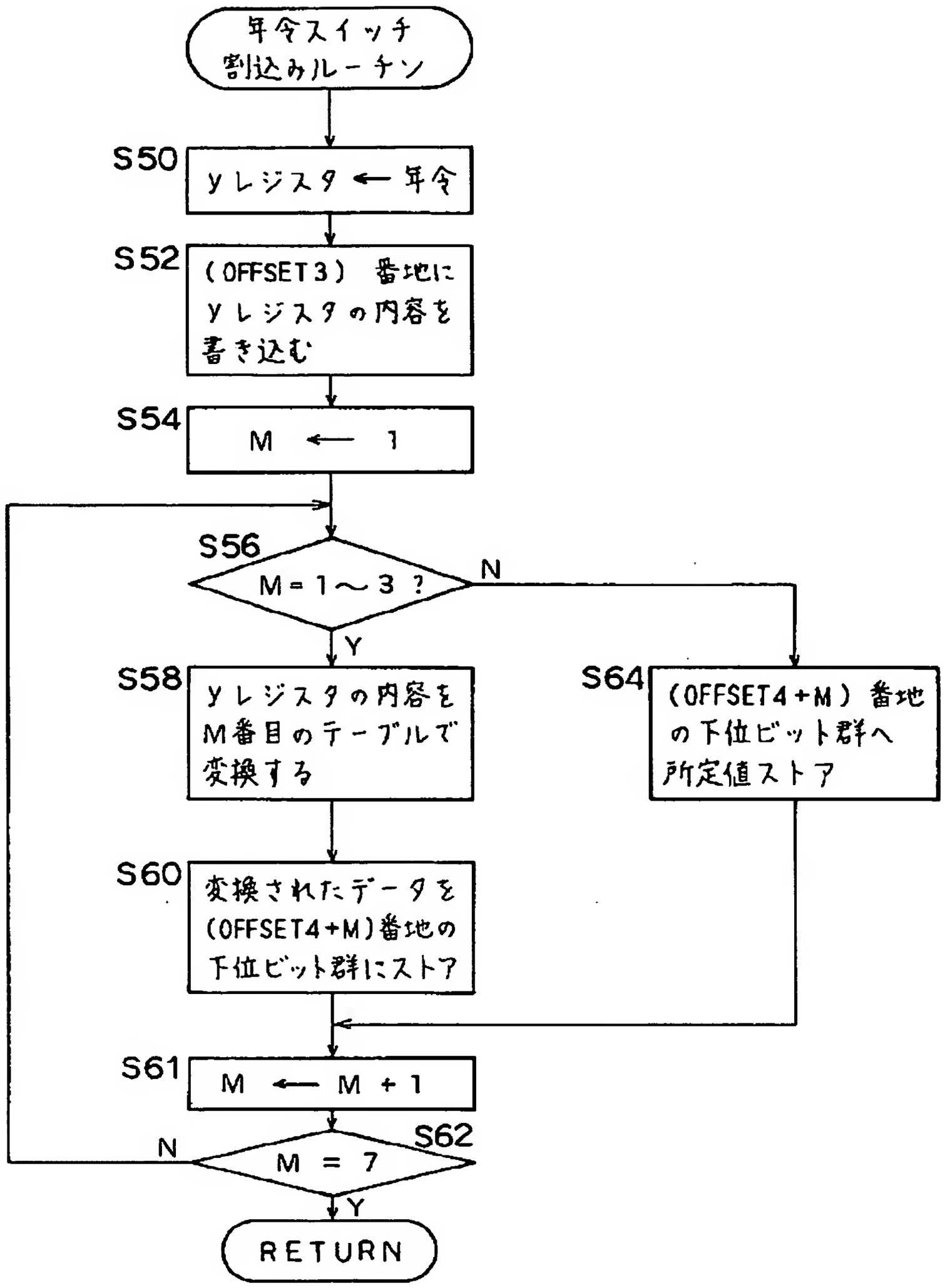
【図８】


ADD1
性別 ?
01. 男性
02. 女性
ADD2
髪型 ?
01. 髪の量が豊かで七三分け
02. 髪の量が薄くて七三分け
ADD3
輪郭 ?
01.
02.
ADD4
目 ?
01.
02.
ADD5
眉毛 ?
01.
02.
ADD6
鼻 ?
01.
02.
ADD7
口 ?
01.
02.
ADD8
年令は ?

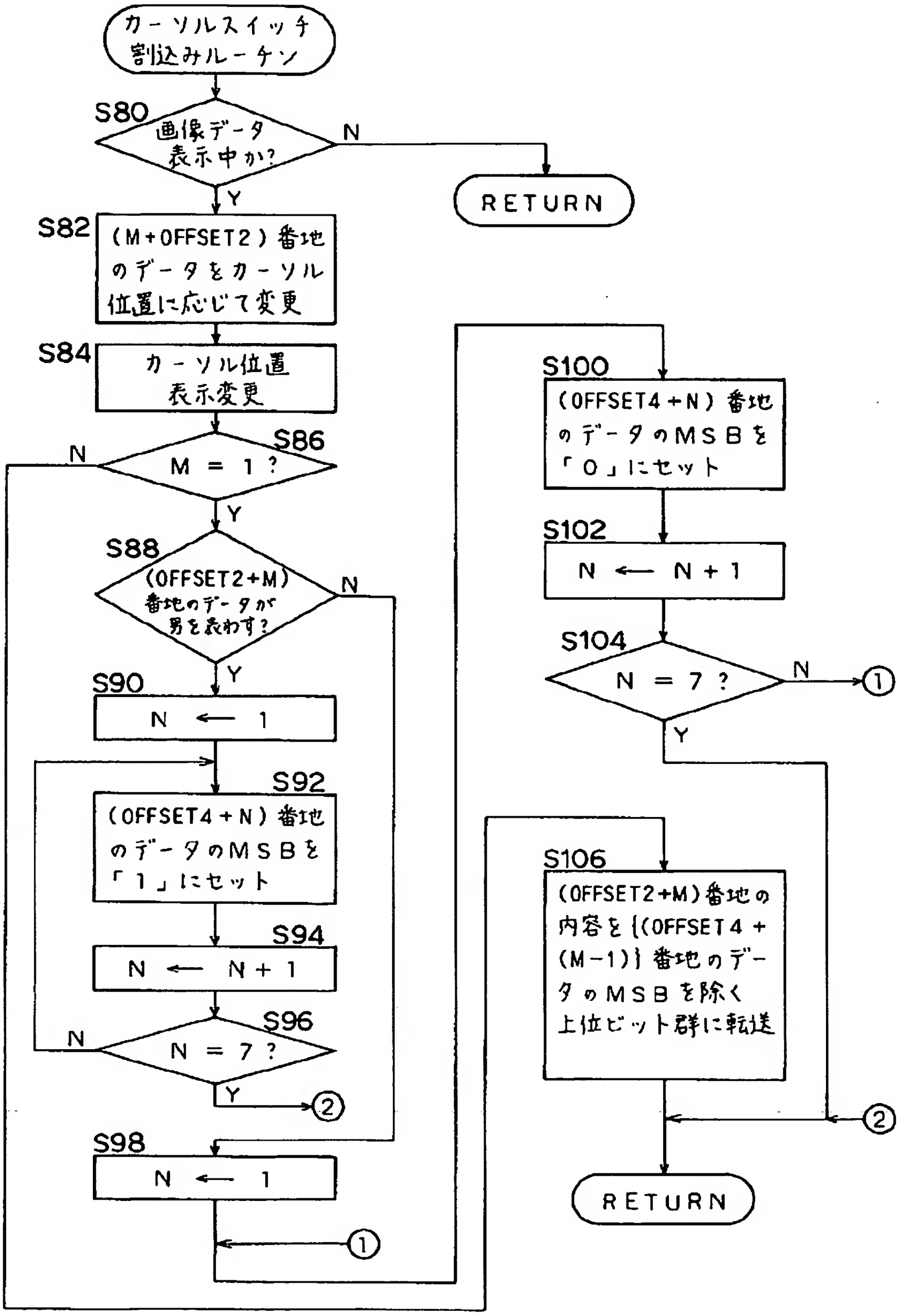
【図９】


(a)
性別 ?
01. 男性
02. 女性
(b)
髪型 ?
01. 髪の量が豊かで七三分け
02. 髪の量が薄くて七三分け
(C)
目 ?
01. 丸形で二重まぶた
02. 卵形
03. きつね形
(d)
眉毛 ?
01. 三ヶ月形
02. 両端さがり形

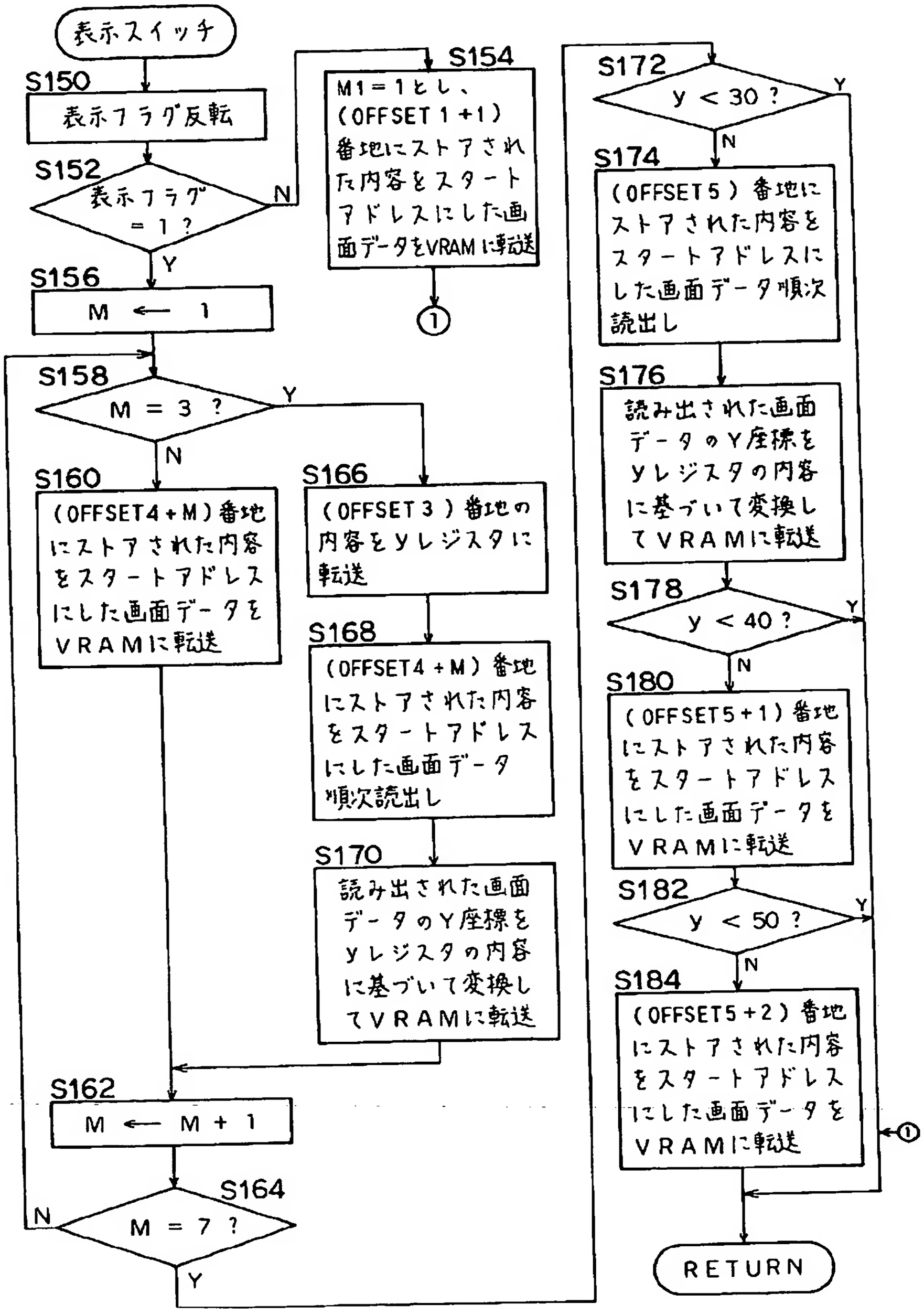
【図１０】


年令スイッチ
割込みルーチン
S50
yレジスタ ← 年令
S52
(OFFSET3) 番地に
yレジスタの内容を
書き込む
S54
M ← 1
S56
M=1～3 ?
N
Y
S58
yレジスタの内容を
M番目のテーブルで
変換する
S64
(OFFSET4+M) 番地
の下位ビット群へ
所定値ストア
S60
変換されたデータを
(OFFSET4+M)番地の
下位ビット群にストア
S61
M ← M+1
S62
M = 7
N
Y
RETURN

【図１１】


カーソルスイッチ割込みルーチン
S80
画像データ表示中か?
N
RETURN
Y
S82
(M+OFFSET2)番地のデータをカーソル位置に応じて変更
S84
カーソル位置表示変更
S86
M = 1 ?
N
Y
S88
(OFFSET2+M)番地のデータが男を表わす?
N
Y
S90
N ← 1
S92
(OFFSET4+N)番地のデータのMSBを「1」にセット
S94
N ← N+1
S96
N = 7 ?
N
Y
②
S98
N ← 1
①
S100
(OFFSET4+N)番地のデータのMSBを「0」にセット
S102
N ← N+1
S104
N = 7 ?
N
①
Y
S106
(OFFSET2+M)番地の内容を{(OFFSET4+(M-1)}番地のデータのMSBを除く上位ビット群に転送
②
RETURN

【図１２】


表示スイッチ
S150
表示フラグ反転
S152
表示フラグ＝１？
N
Y
S154
M1＝1とし、(OFFSET1+1)番地にストアされた内容をスタートアドレスにした画面データをVRAMに転送
①
S156
M ← 1
S158
M = 3 ？
Y
N
S160
(OFFSET4+M)番地にストアされた内容をスタートアドレスにした画面データをVRAMに転送
S166
(OFFSET3)番地の内容をyレジスタに転送
S168
(OFFSET4+M)番地にストアされた内容をスタートアドレスにした画面データ順次読出し
S170
読み出された画面データのY座標をyレジスタの内容に基づいて変換してVRAMに転送
S162
M ← M + 1
S164
M = 7 ？
N
Y
S172
y < 30 ？
Y
N
S174
(OFFSET5)番地にストアされた内容をスタートアドレスにした画面データ順次読出し
S176
読み出された画面データのY座標をyレジスタの内容に基づいて変換してVRAMに転送
S178
y < 40 ？
Y
N
S180
(OFFSET5+1)番地にストアされた内容をスタートアドレスにした画面データをVRAMに転送
S182
y < 50 ？
Y
N
S184
(OFFSET5+2)番地にストアされた内容をスタートアドレスにした画面データをVRAMに転送
①
RETURN